News about

B. F. Goodrich Chemical Company *raw materials*

...WITH Good-rite RESIN 50

GOOD-RITE Resin 50 is an easy-processing reinforcing agent with advantages that cut rubber compounding costs—and improve finished products.

It affords a new and simple compounding approach to hardness problems. For example, it's a means of filling in the gap between soft rubber compounds and ebonites.

More advantages! It saves time by eliminating masterbatching. It gives rubber compounds better flex life . . . higher elongation . . . improved abrasion resistance . . . and easier handling because Resin 50 acts as a plasticizer at processing temperatures.

In extruding gaskets, tubing, coving, etc. —especially on hard compounds—Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

Good-rite Resin 50 is a white, free-flowing powder. It can be compounded in a wide range of attractive colors. Send for technical bulletins. Find out how Good-rite Resin 50 improves rubber compounding, cuts costs too. Please address Dept. CA-2, B.F.Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company

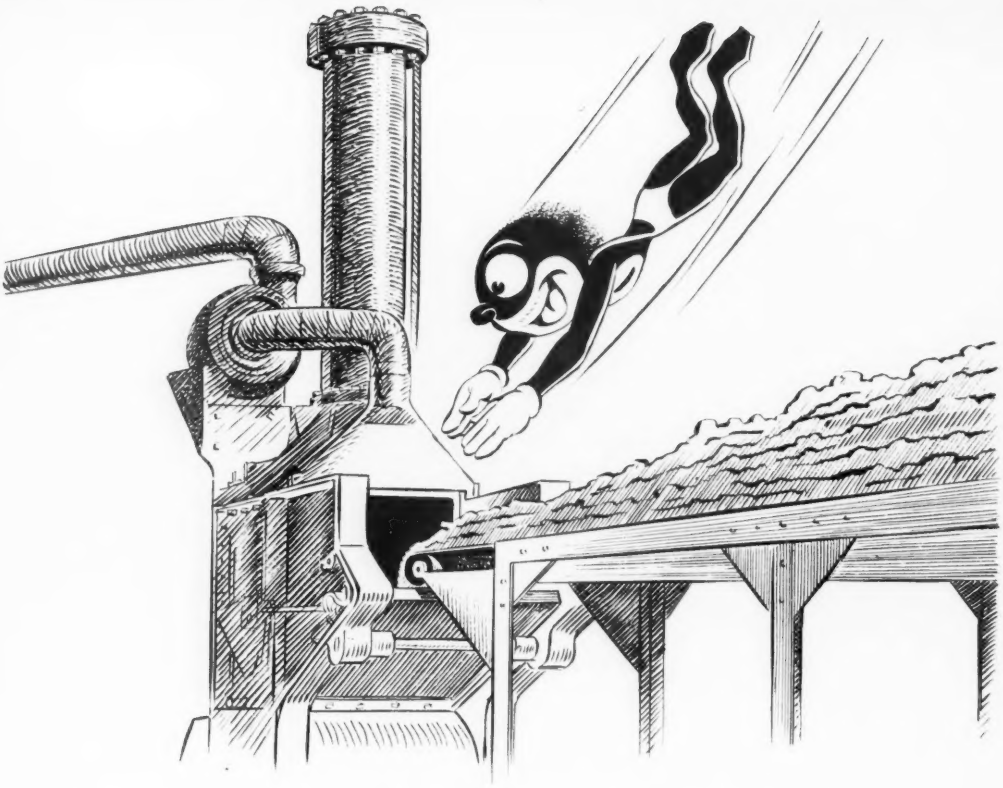
A Division of The B. F. Goodrich Company

Hycar

Reg. U.S. Pat. Off.

American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



For long flex life use this elixir

Put **Philblack*** **O** *in your Banbury Mixer!*

Old tires never die, they hardly wear away! That's right . . . when toughened with Philblack O the mortality rate goes down, down, *down* . . . and life expectancy goes up, up, *up!* That's because Philblack O imparts really remarkable flex life, excellent aging qualities, and exceptional abrasion resistance. Helps dissipate static electricity, too.

Combine this HAF (High Abrasion Furnace) black with natural or synthetic rubber for tire treads, conveyor belts, industrial hose and other rubber products where you need phenomenal endurance at reasonable cost. For proper compounding procedures and recipes consult Philblack's technical service representatives. Philblack O is shipped in bags or in bulk in hopper cars specially designed to facilitate unloading.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

EVANS BUILDING · AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION • 80 BROADWAY • NEW YORK 5, N. Y.

* A Trademark

Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

rubber compounders prefer PLIOLITE S-6B

6 to 1

After direct comparison with competitive resins, rubber compounders throughout the industry report they prefer PLIOLITE S-6B—*by nearly six to one!* Specific characteristics of this use-proved Goodyear rubber reinforcing resin mentioned in the survey were:

EASIER PROCESSABILITY
MORE THOROUGH COMPATIBILITY
EXCELLENT PHYSICAL PROPERTIES

PLIOLITE S-6B is already in use in shoe soles, wire insulation, flooring, rubber hose and tubing and a wide range of molded and inflated rubber items. But these are only a few of the potential uses of this leader in the field of copolymers for reinforcing rubber.

Write today for full details, and samples for your own evaluation, to:

Goodyear, Chemical Division, Akron 16, Ohio

USE PROVED *Products*

GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

ACTIVATOR NEWS

HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

ANNOUNCING

The FIRST French Process Zinc Oxide Surface-Treated with Propionic Acid

PROTOX*-168

Improves Reinforcement 2 Important Ways

1. 130% MORE SPECIFIC SURFACE AREA

Made by a modified French Process, its finer particle size has a specific surface area of 8 sq. meters per gram. (Conventional French Process zinc oxide has 3.5 sq. meters.)

2. BETTER DISPERSION IN RUBBER

Protox-168, prepared by treating Kadox-72 with propionic acid, has the outstanding dispersion characteristics of the other Protox brands.

Better dispersion of Protox-168, compared with Kadox-72 or conventional French Process zinc oxide, results in improved tensiles, tear and modulus.

May we send you samples of Protox-168 for your tests?

*U. S. Patents 2,303,329 and 2,303,330

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

AETNA-STANDARD BUYS RUBBER AND PLASTICS DIVISION OF NATIONAL-ERIE

E. E. Swartswelter, President of The Aetna-Standard Engineering Company, Pittsburgh, Pa., announces the purchase of the rubber and plastics machinery division of the National-Erie Corporation, Erie, Pa., a subsidiary of Bucyrus-Erie Company.

The purchase includes the drawings, patents and records.

Aetna-Standard will manufacture a complete line of rubber and plastics machinery in their large, well equipped plant at Warren, Ohio. Sales and design engineering will be handled by Hale & Kullgren, Inc., Akron, Ohio.

In the ferrous and non-ferrous industries, Aetna-Standard is well known for continuous butt weld pipe mills, seamless tube mills, continuous coating lines, flat-rolled equipment and drawbenches. The company has also been active in the rubber machinery field as a rebuilder of Banbury Mixers and in the development of heavy basic machinery.

The company will take over many of the orders on National-Erie's books and will solicit new orders through Hale & Kullgren, Inc.

PRODUCTS

MILLS • WASHERS • CRACKERS • SHEETERS • REFINERS • EXTRUDERS • STRAINERS • INSULATORS • BANBURY MIXERS • HYDRAULIC PLATEN PRESSES • HORIZONTAL VULCANIZERS • DEVULCANIZERS • SIMPLEX QUICK OPENING DOORS • SPECIAL MACHINERY

HALE & KULLGREN, INC., HANDLE SALES

The well known firm of (Andy) Hale & (Gil) Kullgren, Inc., Akron, Ohio, will continue to handle the sales, design engineering and development work for Aetna-Standard. The engineering and sales personnel of National-Erie will join Hale & Kullgren in Akron, Ohio.

Sales Distributors and Designers
HALE & KULLGREN, INC., Akron, Ohio

50 YEARS OF CREATIVE ENGINEERING

Aetna-Standard has a long and enviable record in the business of engineering and manufacturing machinery for the ferrous and non-ferrous industries. They have two large, well equipped plants and are now completing a major expansion program to provide the best facilities for producing production machinery.

Aetna-Standard

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Plants in Warren, Ohio · Ellwood City, Pennsylvania

Need more protection?

STABILITE*

THE ANTIOXIDANT WITH UNIQUE CHARACTERISTICS

When looking for the most economical and outstanding antioxidant for both natural and synthetic rubber, consider STABILITE, which has, combined in one material, the following characteristics:

1. *Protection against oxidation and heat, suncheck-ing and mechanical flexing.*
2. *Distinct softening effect on uncured rubber or GR-S, resulting in better processing and dispersion, smoother calendering and tubing and at the same time without effect on modulus at cure.*
3. *The unique property of increasing the effect of most commercial antioxidants when used in conjunction with* STABILITE. *The effect of such mixtures is greater than the components.*

For the protection of your rubber products use STABILITE; for maximum resistance to oxidation, heat, sunchecking and mechanical flexing replace part of your present antioxidant with STABILITE.

*MANUFACTURED BY CHEMICO, INC.
THE C. P. HALL CO. *Manufacturing Agents*

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

AKRON, OHIO • LOS ANGELES, CALIFORNIA • CHICAGO, ILLINOIS • NEWARK, N. J.

injection moldings, too

gain with the use of PLIOVIC

***TYPICAL INJECTION MOLDINGS** made on standard equipment using PLIOVIC Goodyear's use-proved vinyl resin.*

USE PROVED *Products*

Pliovic—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Toughness, superior oil-grease resistance and good aging characteristics mark injection moldings made with PLIOVIC—Goodyear's versatile vinyl resin. Typical examples are the luggage welting, furniture boot and automobile arm rest shown.

Compounders have found that PLIOVIC offers versatility of formulation—can be more highly loaded yet requires less plasticizer, compared with competitive resins. And PLIOVIC gives a wide range of bright color possibilities, at low cost, as well.

For full details see a Goodyear Chemical Division Representative today, or write:

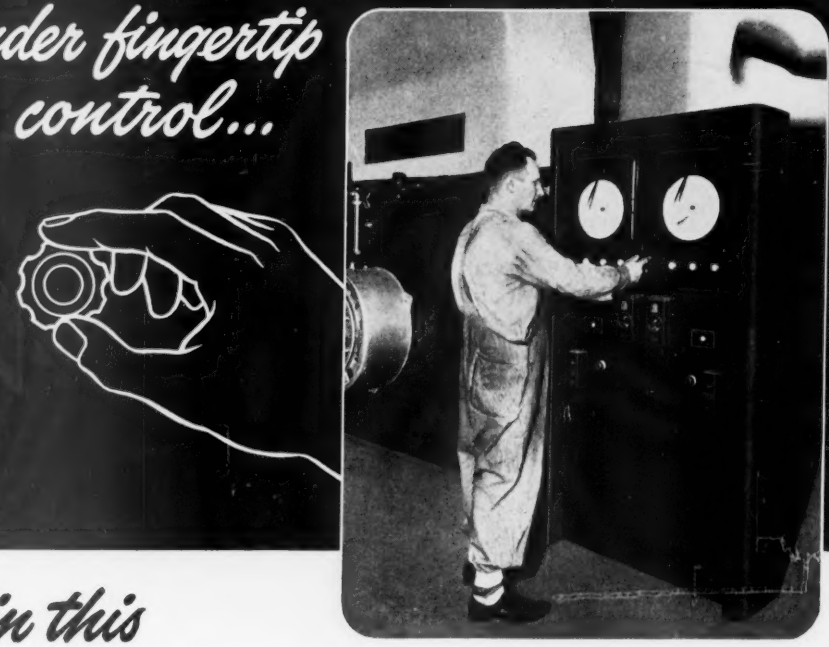
Goodyear, Chemical Division
Akron 16, Ohio

GOODYEAR

THE FINEST LINE OF CHEMICALS FOR INDUSTRY

10,000 Pounds Constant Tension

under fingertip control...



... in this

IOI Nylon Tire Fabric Latexer

Complete one-man process control is but one of the many outstanding advanced-design features of this IOI latexing machine. Here are just a few of the others:

- **Simultaneous impregnation, drying and attenuation of the cords, resulting in pre-stretched tire fabric that requires no further processing prior to calendering.**
- **Direct gas-fired heating, under complete control, provides the correct high temperature required for the most efficient rate of drying either woven or weftless fabric.**
- **Rugged in construction, yet extremely flexible in operation, with constant-tension control at all speeds.**
- **Units available in various capacities, from small production machines up to high speed calender train installations.**
- **These machines require very little cleaning and a minimum of housekeeping maintenance.**

An Industrial Ovens engineer will be glad to call at your convenience to discuss the application of this machine to your particular latexing requirements.

INDUSTRIAL IOI ENGINEERING VERSATILITY **OVENS, INC.**

13825 TRISKETT ROAD CLEVELAND 11, OHIO

Use United Blacks

UNITED CARBON COMPANY, INC.

CHARLESTON 27,
WEST VIRGINIA

NEW YORK • AKRON • CHICAGO • BOSTON

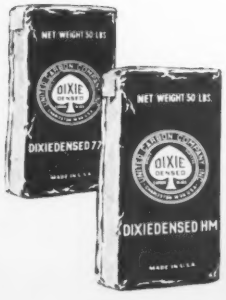
. . . for durability

DIXIEDENSED 77 (EPC)

DIXIEDENSED HM (MPC)

These are the finest rubber grade channel blacks made. They are designed to give the compounder exactly what he is looking for in channel blacks - - - cool mixing, easy processing, high reinforcement, and excellent service performance.

Insist on United Blacks.



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An 800 TON HYDRAULIC PRESS....

FOR THE PRECISION MOLDING OF RUBBER PRODUCTS

THIS Erie Foundry Company 800 Ton Precision Hydraulic Press is designed and built to close tolerances. A number of these special presses purchased by one of the nation's largest rubber processors, are required in precision molding of special rubber products. Your specifications for precision presses are in capable hands when you send them to Erie Foundry Company. A half century of engineering and craftsmanship is at your command. Write for bulletin 350.

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ERIE FOUNDRY COMPANY · ERIE, PA., U.S.A.

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AQUEOUS SUSPENSIONS OF ULTRA ACCELERATORS

ALCO OIL & CHEMICAL CORPORATION

First to Present as Prime Producers

AQUEOUS SUSPENSIONS OF ULTRA ACCELERATORS,
BY A NEW PROCESS, FOR LATEX COMPOUNDING

VULCACURE

VULCACURE ZM
50% Zinc Dimethyldithiocarbamate

VULCACURE ZE
50% Zinc Diethyldithiocarbamate

VULCACURE ZB
50% Zinc Dibutyldithiocarbamate

VULCACURE NB
47% Sodium Dibutyldithiocarbamate

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PROVEN PRACTICAL AND ECONOMICAL

PARTICLE SIZE EQUIVALENT
TO FORTY-EIGHT HOUR BALL MILLED DISPERSIONS

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TRENTON AVENUE & WILLIAM STREET, PHILADELPHIA 34, PA.

AQUEOUS SUSPENSIONS OF ULTRA ACCELERATORS

VULCACURE • VULCACURE • VULCACURE • VULCACURE

Tires that move the earth

Giant earthmovers have changed the face of our country . . . building roads, laying foundations, even the mining of open-strip ore veins. These machines of progress are made possible and practical by the ingenuity of America's tire manufacturers. Vital to proper performance of these giant tires is the valve that *locks* the air in the tire.

Schrader—top tire valve manufacturer—actually produced the first working samples of large bore tire valves in cooperation with the tire industry. What started as an experimental development is now a complete, practical line of Schrader Products to help the industry move the earth.

A. SCHRADER'S SON, BROOKLYN 17, N. Y.
Division of Scovill Manufacturing Company, Incorporated

Schrader
REG. U. S. PAT. OFF.

FIRST NAME IN TIRE VALVES
FOR ORIGINAL EQUIPMENT AND REPLACEMENT

IF YOU WANT

- ★ EASIER PROCESSING
- ★ BETTER QUALITY
- ★ LOWER COST

in white sidewall compounds . . .

replace most of the zinc oxide with HI-SIL

Production of white sidewall tires is again permitted under the provisions of the recently amended M-2 Rubber Control Order.

Compounders who, prior to restrictions, ran natural rubber or natural rubber-neoprene compounds loaded with titanium oxide and zinc oxide will do well to consider replacement of the latter pigment with Hi-Sil retaining only enough zinc oxide for the activation.

Replacing most of the zinc oxide with Hi-Sil offers advantages in manufacturing white sidewall tires and results in better quality at lower cost.

These are among the advantages you can expect with HI-SIL

IN PROCESSING

1. **EASIER TO BUILD.** It is easier to build tires with Hi-Sil loaded white sidewall compounds. Highly loaded zinc oxide stocks containing no Hi-Sil are soft and sidewalls extruded from them are easily deformed in storage and handling.

2. **PREVENTS LIGHT SPOTS.** Tires having Hi-Sil loaded white sidewalls come out of the molds with fewer light spots. Highly loaded zinc oxide stocks containing no Hi-Sil are soft and flow too readily. Consequently, air is trapped between the uncured tire and the mold and the resulting cured tire has light spots in the sidewall—areas where it has not completely filled the mold.

3. **PREVENTS TORN SPOTS.** Tires having Hi-Sil loaded white sidewalls come out of the molds with fewer torn spots at the vents. Highly loaded zinc oxide stocks containing no Hi-Sil are too soft and flow into the mold vents. This stock subsequently tears off when the cured tire is removed from the mold. Hi-Sil stocks, being stiffer and having better hot tear, prevent such blemishes. Loss of mold time while vents are cleaned is eliminated.

4. **EASIER TO BUFF.** Tires having Hi-Sil loaded white sidewalls are easier to buff. Highly loaded zinc oxide stocks, containing no Hi-Sil, have low modulus. Consequently, stock stretches with the buffer instead of resisting it. Hi-Sil stocks are easy to buff. Brands and size marks still have sharp, distinct edges after buffing.

IN QUALITY

5. **MORE SERVICEABLE.** Hi-Sil loaded white sidewall stocks have better snag and tear resistance and are more resistant to curb scuffing.

IN COST

6. **LOWER VOLUME COST.** Hi-Sil has a lower pound cost than zinc oxide. Specific gravity of Hi-Sil is only 1.95 compared with 5.57 for zinc oxide. Therefore, the volume cost of Hi-Sil is less than one-quarter that of zinc oxide:

Volume cost of HI-SIL
11¢ x 1.95 equals 21.45¢

Volume cost of ZINC OXIDE
16¢ to 18¼¢ x 5.57
equals 89.12¢ to $1.02

Resume your white sidewall production by using Hi-Sil in your compounds. Columbia-Southern's Technical Staff will be glad to assist you in getting started, or will offer recommendations on any of your rubber compounding problems.

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

EXECUTIVE OFFICES: FIFTH AVENUE AT BELLEFIELD, PITTSBURGH 13, PA. TELEPHONE MAyflower 1-2960.
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Thiokol*

Plasticizers are again available!

WITHOUT RATINGS

TP-90B

Highly compatible with GR-S, Neoprene, Buna N's and Natural Rubber. Imparts excellent low temperature flexibility and resilience. It is both economical and efficient.

TP-95

For plasticizing Buna N rubbers, GR-M and vinyl resins. Imparts excellent low temperature flexibility or good heat resistance. It is economical and efficient.

TECHNICAL INFORMATION AND SAMPLES ON REQUEST

*THIOKOL, REG. U.S. PAT. OFF.

783 NORTH CLINTON AVENUE

Thiokol CORPORATION

TRENTON 7, NEW JERSEY

In Athens... we make only one thing:

THE WORLD'S FINEST TIRE MOLDS

We don't know who said it first — but we believe it to the hilt — "practice makes perfect".

That's why we consolidated all our tire mold manufacturing facilities in our Athens plant — the only plant in the world, we believe, devoted exclusively to tire mold manufacture.

Here we utilize machines for one purpose only; build special controls, special jigs and fixtures for automatic operation without the problem of day to day changeover to meet other manufacturing requirements. Here craftsmen develop specialized skills to the highest degree. Here plant management is concerned with only one problem — how to make better tire molds.

What does it mean to the tire manufacturer? Two things: molds of unsurpassed quality; molds at the lowest possible cost.

1711

ATHENS MACHINE DIVISION

THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

FOR BETTER MOLDS FOR BETTER TIRES *SPECIFY* BRIDGWATER

now *in expanded production*

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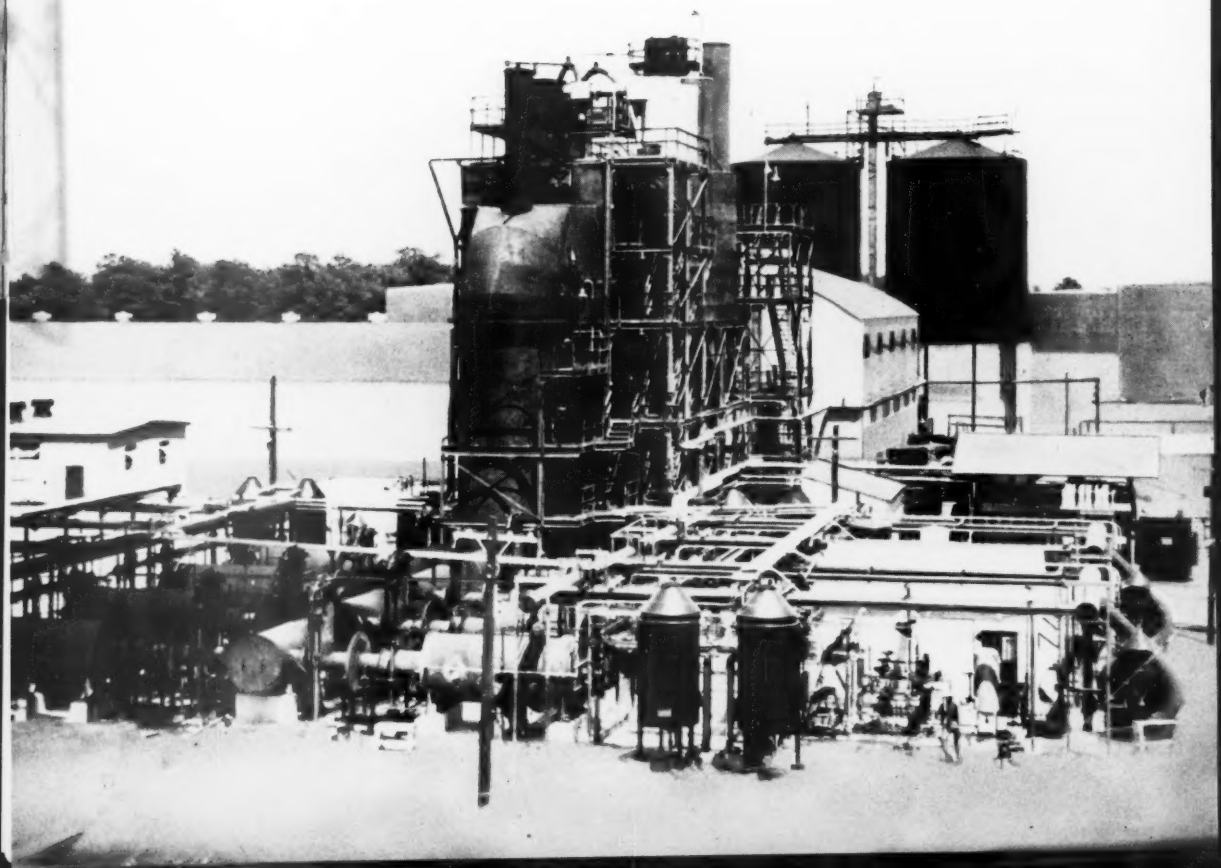

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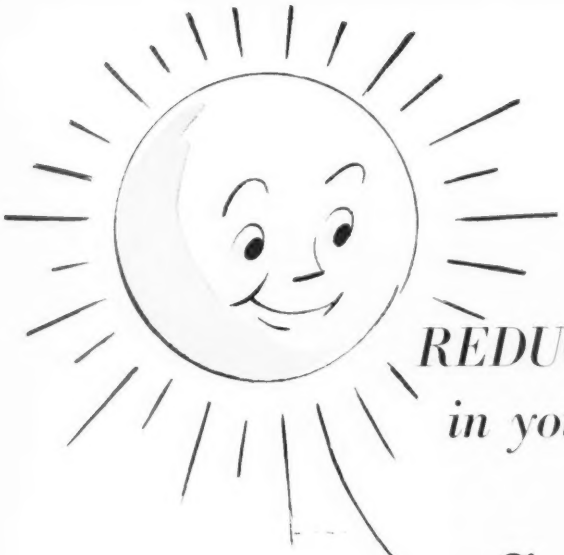

How to REDUCE BLISTERING in your tile processing with

SOLKA-FLOC®

It's an easy job. Just use 20 volumes of SOLKA-FLOC to replace an equal volume of mineral filler. In addition to reduced blistering you'll get harder, smoother surfaces . . . sharper designs . . . controlled shrinkage . . . reduced nerve . . . easier processing.

SOLKA-FLOC, a highly purified cellulose, has found wide application in the rubber field. In fact, it has proved to be such a valuable processing aid in the manufacture of such products as tiling, soling, matting, molded goods, extruded goods, etc., that *Brown Company has doubled its production of SOLKA-FLOC.*

Why not find out more about its use in processing? It could mean a better product, bigger profits for you. Write Technical Service, Dept. GF4, at Boston, for recommendations and samples.

BROWN QUALITY **COMPANY, Berlin, New Hampshire**
CORPORATION, La Tuque, Quebec

General Sales Offices: 150 Causeway St., Boston 14, Mass.—Dominion Square Bldg., Montreal, Quebec

SOLKA & CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS • NIBROC TOWELS • NIBROC KOWTOWLS
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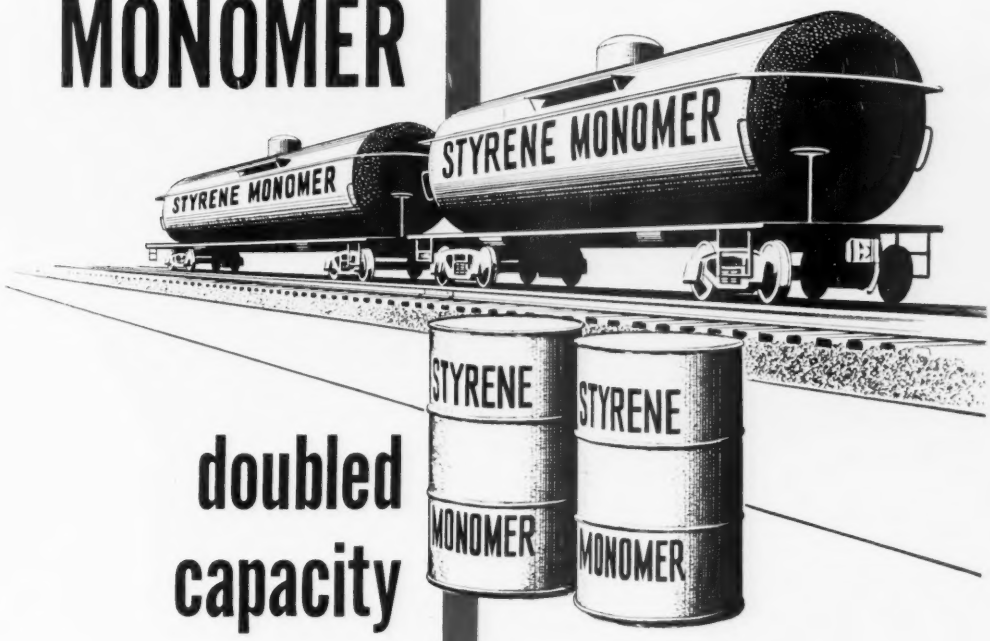
STYRENE MONOMER



doubled capacity

Increased production of styrene monomer by Monsanto in its expanded Texas City plant now makes available *double the quantity* of this reactive raw material . . . Made to rigid Monsanto standards, it provides a greatly enlarged source of monomer for the production of resins and copolymers.

Private industry's requirements can now be met from this increased tonnage, available in commercial and research quantities. Shipped in tank cars and in 55-gallon drums . . . MONSANTO CHEMICAL COMPANY, Texas Division, Texas City, Texas.

MANY USES . . . Monsanto styrene monomer is used in the production of polystyrene molding compounds; GR-S type synthetic rubber; styrene-butadiene emulsions for water-dispersible paints; styrenated oils for surface-coating resins; styrene-modified alkyds for air-drying and baking finishes; low-pressure laminating resins; styrene emulsions and copolymer emulsions for modifying properties of paper and textiles; ion exchange resins . . . Write for new Monsanto Styrene Monomer Technical Bulletin.

MONSANTO
CHEMICALS—PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

applications of

VELSICOL RESINS

FOR RUBBER COMPOUNDING

GE-9—AB11-4—AB11-2

some suggested applications:

MECHANICAL GOODS
ELECTRICAL INSULATION COMPOUNDS
RUBBER SHOE SOLES AND HEELS
RUBBER FLOOR TILING
GASKETS AND JAR RINGS
RUBBER ADHESIVES AND CEMENTS
MOLDED RUBBER PRODUCTS
TUBULAR COMPOUNDS
RECLAIMED RUBBER
SHEETING
COLORED RUBBER STOCKS
BATTERY CASES
HARD RUBBER COMPOUNDS

features:

1. THERMOPLASTIC HYDROCARBON RESINS.
2. COMPATIBLE WITH NATURAL AND SYNTHETIC RUBBERS.
3. EFFECTIVE PLASTICIZERS AND SOFTENERS... in highly-loaded clay stocks or in recipes incorporating carbon black.
4. MILL READILY.
5. EXCELLENT DISPERSING AGENTS FOR FILLERS AND PIGMENTS.
6. FACILITATE PROCESSING PROCEDURES . . . impart excellent milling, calendering processing and tubing characteristics to stocks.
7. IMPART EXCELLENT PERFORMANCE CHARACTERISTICS . . . such as good tensile strength, elongation and modulus, as well as good resistance to abrasion and aging.
8. POSSESS HIGH ELECTRICAL RESISTANCE PROPERTIES.
9. AID IN THE DEVELOPMENT OF NON-SCORCHY STOCKS... without excessive retardation of cure at high temperatures.

For additional information concerning properties and applications of Velsicol Resins, write:

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pound for Pound

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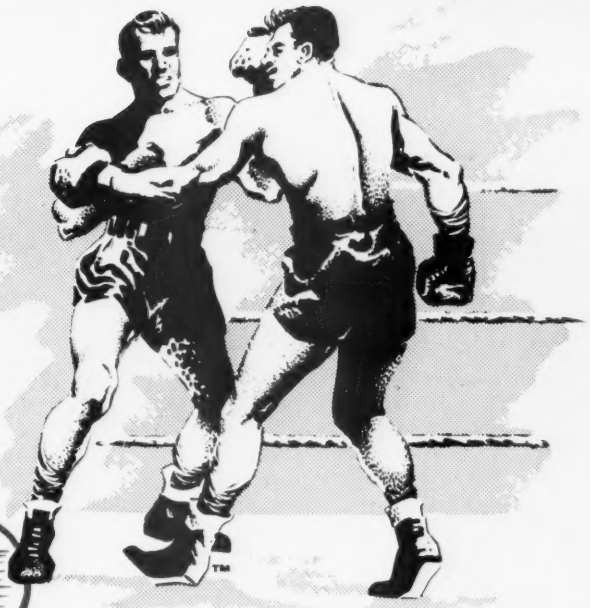

Crystex

INSOLUBLE SULPHUR

Pound for pound, CRYSTEX contains more insoluble sulphur . . . it's guaranteed to be 85% insoluble in Carbon Bisulphide. When you compare the extremely high insoluble sulphur content of CRYSTEX, you'll find CRYSTEX to be less expensive. In fact, by this per unit comparison, CRYSTEX is the most economical insoluble sulphur on the market.

Let us send a generous testing sample and the very latest technical and use data on CRYSTEX Insoluble Sulphur.

OTHER STAUFFER PRODUCTS

Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure
Refined Rubbermakers' Sulphur, Tube Brand
"Conditioned" Rubbermakers' Sulphur
Carbon Tetrachloride
Carbon Bisulphide
Caustic Soda
Ethylene Trithiocarbonate
Sulphur Chloride
Flowers of Sulphur, 99½% Pure
(30% Insoluble Sulphur)
Borax

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824 Wilshire Boulevard, Los Angeles 14, Cal. • 636 California Street, San Francisco 8, Cal.
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MR. CLIMCO SAYS...

LINERETTE PAPER

is *ideal* for separating lightweight stocks

In use for over 20 years, Linerette is a quality, specification sheet that provides a quick and easy way to separate stock without adhesion. Linerette preserves the tackiness of the stock and contains no oil or wax which might migrate.

LINERETTE is furnished in any width up to and including 54", in rolls of 9", 11½", 13", and 15" diameters; put up on 3" i. d. cores. The yield is approximately six square yards to the pound. A 9" roll contains 375 linear yards and a 15" diameter about 1150 linear yards.

SEND FOR SAMPLES—simply specify width desired.

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ILLUSTRATED LINER BOOKLET
Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

MADE BY THE MANUFACTURERS OF CLIMCO PROCESSED LINERS

LINERETTE
INTERLEAVING PAPER

CLIMCO
CLIMCO

A useful group of resins for many types of rubber products, including: tubular goods, toys, tires and tubes, waterproofings, cements, floor tile, and many others.

Piccoumaron

Para-Coumarone-Indene RESINS

Piccoumaron Resins are soluble in coal tar, turpentine, terpene and most chlorinated solvents. Colors vary from pale yellow to deep reddish brown. Good resistance to acids, alkalies and salt. Available in grades from liquids to brittle solids.

Write for samples and complete data on PICCOUMARON Resins.

PENNSYLVANIA
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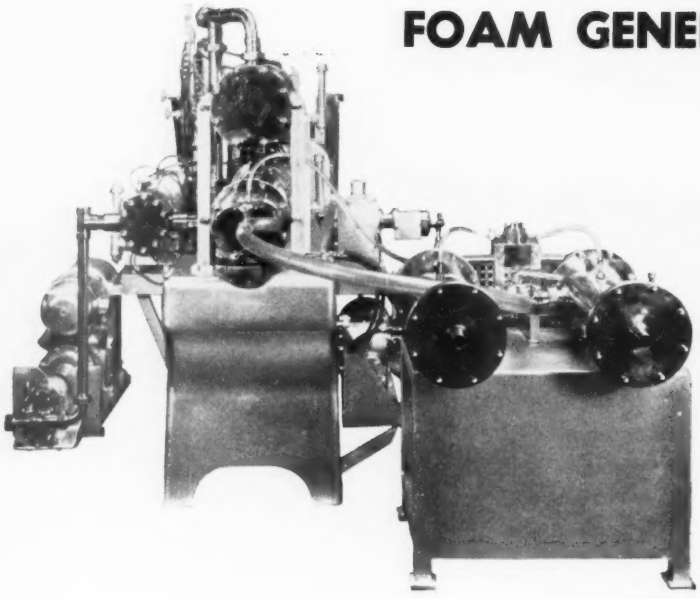
CLAIRTON, PA.
Plants at: Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

PICCO

Distributed by Harwick Standard Chemical Co., Akron 5, Ohio

the FLOW-MASTER *continuous*

FOAM GENERATOR



Equipped with dual blender for continuous operation. Graduated Burrettes for checking metering accuracy of gelling agents, added accelerator, etc.

Self contained unit, requires no accessories or air pumps, ready to install to your water and electric current.

Will produce continuously Foam Rubber of desired density with uniform cell structure from Natural, GRS, Neoprene Latex, or combinations, suitable for slab, or molded goods, pillows, mattresses, rug backing, carpet underlay, etc.

Low production costs.

THE MARCO COMPANY, INC.

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WILMINGTON, DELAWARE

SHARPLES XTRUDED ULTRA ACCELERATORS

THE 9 SERIES

NON-DUSTING,
FREE-FLOWING
PELLETS

SA 52-9 TETRA**METHYL**THIURAM **DI**SULFIDE

SA 62-9 TETRA**ETHYL**THIURAM **DI**SULFIDE

SA 57-9 **ZINC** DI**METHYL**DITHIOCARBAMATE

SA 67-9 **ZINC** DI**ETHYL**DITHIOCARBAMATE

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Use in mill and banbury mixed compounds for minimum dusting, easier handling and improved dispersions.

Use in latex for both ball mill and colloid mill dispersions.

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Rubber Equipment Specialists

SUPPLIERS WHO KNOW THE REQUIREMENTS OF THE RUBBER INDUSTRY

Electrical equipment for:

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Hose REINFORCEMENT WIRE

JOHNSON special bronze plated wire, for many years the preference of major tire manufacturers — now available for vacuum and defroster hose producers, in addition to conventional liquor finish wire.

• Uniformly clean finish • Maximum adhesion to rubber • Higher elongation • Extra fatigue properties

Johnson line of specialty wires also includes oil-tempered and coldrawn brush wire—tire bead wire—steel wire for field telephones —music spring wire.

If it's steel wire— JOHNSON specialists make it better

JOHNSON
STEEL AND WIRE COMPANY, INC.
Worcester 1, Mass. Akron, Ohio Los Angeles, Calif.

Highlights in the history of Rubber Processing

1906 First organic accelerator

1924 First U. S. patent on the use of age resistors

1925 Mercaptobenzothiazole (MBT)

1935 First catalytic plasticizer

1946 Calco developed the first commercial catalytic plasticizer free from toxic effects and objectionable odor: PEPTON® 22 Plasticizer

1947 Reinforcing furnace blacks became commercially available

1950 ANTIOXIDANT 2246* — the most active non-staining, non-discoloring antioxidant ever developed. A product of Calco

1951 ANOTHER STEP FORWARD . . . Calco introduces an important new product to the Rubber Industry . . .

NOBS No. 1, the outstanding delayed-action accelerator for natural, synthetic and reclaimed rubber. It is ideal for use with reinforcing furnace blacks in up-to-date tire-compounding. No special handling is required.

Calco®

*Trade-mark

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION

INTERMEDIATE & RUBBER CHEMICALS DEPARTMENT

BOUND BROOK, NEW JERSEY

SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

You can't meet competition or stop Stalin by pitching raw materials and manpower into the scrap bin.

And if you don't know how to eliminate scrap ask Moe Muscles or any other pressman who has worked with our silicone release agents.

They'll tell you how much easier it is to unload deep cavity molds and complicated shapes. That eliminates torn heats. And because only a very light application is required to give easy release, you can check off non-knits, fold-overs and loose tuck-unders too.

They'll tell you how much our silicone lubricants improve flow—even in heavily loaded stocks. That puts an end to non-fill rejects.

By keeping molds cleaner longer, our silicone release agents also help to maintain close tolerances; keep white and light colored stocks clean; assure uniformly high surface finish and sharp detail.

Dow Corning Silicones Mean Business!

For more information call our nearest branch offices or write for data sheet M-16

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MIDLAND, MICHIGAN

For Easier Release and Better Quality
SPECIFY
DOW CORNING SILICONE MOLD RELEASE AGENTS
EMULSIONS for molds and curing bags; MOLD RELEASE FLUID in solvent solution for green carcass, bead and parting line release.

FIRST IN SILICONES
DOW CORNING CORPORATION

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See how many ways
you can use this nitrile type oil-resistant rubber!

Here's a complete technical bulletin on an amazingly versatile chemical rubber. It's designed for your use. Fill out the coupon below!

28 fact-filled pages give important information and "how to" explanations you'll want to use time and time again.

- **current data on properties, uses, compounding, and processing**
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- **test recipes and complete test results for various compounds**
- **easy-to-read summary of relative characteristics of different grades**
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You'll find Paracril chemical rubber ideal for applications requiring oil resistance over an extremely wide temperature range. And you'll find its excellent processing characteristics and many other desirable properties a great advantage *wherever* rubberlike properties are needed. *Send for your copy of this valuable booklet today!*

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City..... Zone..... State.....

Naugatuck Chemical NAUGATUCK, CONNECTICUT

Division of United States Rubber Company

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For hard rubber battery parts use "PEQUANOC BOND" reclaim

Many manufacturers use Pequanoc BOND reclaim for hard rubber covers and vents of starting, lighting and ignition batteries, and for storage battery containers.

They find it economical and effective in their formulations. Here is a popular hard rubber formula with average costs:

FORMULA A-193-1	
GR-S	5.00
Pequanoc BOND Reclaim	31.00
Carbon Filler Oxide	42.00
Hard Rubber Dust	10.00
Heavy Calcined Magnesia	1.50
Sulfur	6.50
Saturated Hydrocarbon	4.00
	100.00
Approx. Lb. Cost	.0623
Specific Gravity	1.38
Volume Cost	.0860
Cure	12 Min. @ 130#
Tensile	2700 lbs.
Elongation	2.5%
D Durometer	84

Pequanoc Rubber Co.

MANUFACTURERS OF RECLAIMED RUBBER

MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

Cold Rubber Catalyst

PROBLEM . . .

. . . to help the rubber industry perfect low temperature polymers and accelerate their commercial production for manufacture of automobile and truck tires.

SOLUTION . . .

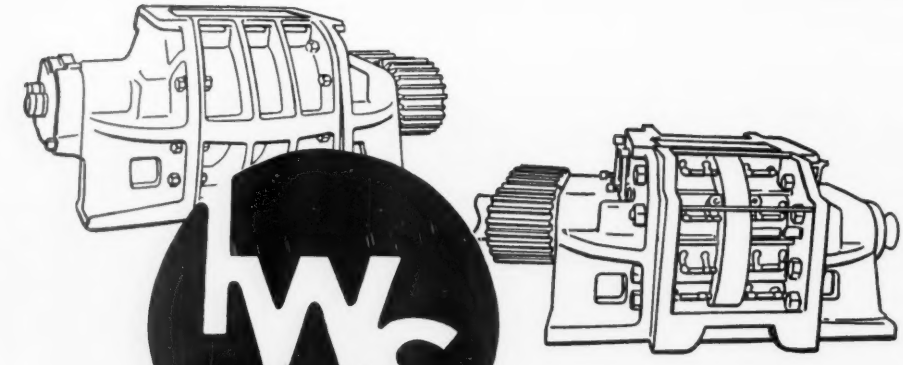
. . . a new synthetic rubber catalyst, Para-Menthane Hydroperoxide—which shows exceptionally high polymerization activity and has been found particularly satisfactory for production of synthetic cold rubbers of the GR-S-100 type. Hercules® Para-Menthane Hydroperoxide (PMHP) also shows promise as a catalyst for the emulsion polymerization of other monomers.

RESULT . . .

. . . tougher, longer-wearing rubber that can be economically produced in quantity from readily available materials. Not only tires, but many other civilian and defense products are prospects for cold rubber. This successful synthetic owes its rapid growth largely to the catalysts which were ready when needed.

Other commercial grade hydroperoxides produced by Hercules and used as polymerization catalysts include Hercules® Cumene Hydroperoxide (CHP) and Hercules® Diisopropylbenzene Hydroperoxide (DIBHP). Many Hercules chemicals have helped in the development of synthetic rubbers and in improvements of natural rubber products, too. These include hydrogenated rosin, polymerized rosin, Vinsol® resins, emulsifiers, reclaiming agents, casein, and purified cotton linters as a base for tougher tire cords. Hercules welcomes the opportunity of placing its long experience in rubber and associated chemical materials at your disposal.

HERCULES POWDER COMPANY *INCORPORATED* *918 Market Street, Wilmington 99, Delaware*



Integrity . . . Workmanship
Service

Your Guide to Accurate

BANBURY REBUILDING

With the Maximum of Time Saved

Rebuilding a Banbury Mixer body — accurately — cannot be done by theory, nor by machinery alone.

There must be specialized, definite "know how" — the hard practical judgment which can recognize what is required to restore the original work capacity, supported by the skill and facilities to accomplish that end *with certainty*.

We have spent SEVENTEEN YEARS specializing on Banbury rebuilding and repairing. We now have plant facilities in four cities to expedite the orders from our many customers who recognize that the only real bargain is quality workmanship.

Interstate Rebuilding Service offers you two options: You can INTERCHANGE your old mixer body for one of ours, already completely rebuilt — or you can use our "PRE-PLAN" method to have your present body rebuilt and returned to you. Either way YOU SAVE valuable weeks of production time.

Our plant facilities handle every size and type of Banbury, and we can master any problem of restoring worn parts, or fabricating new ones. Estimates gladly furnished.

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EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

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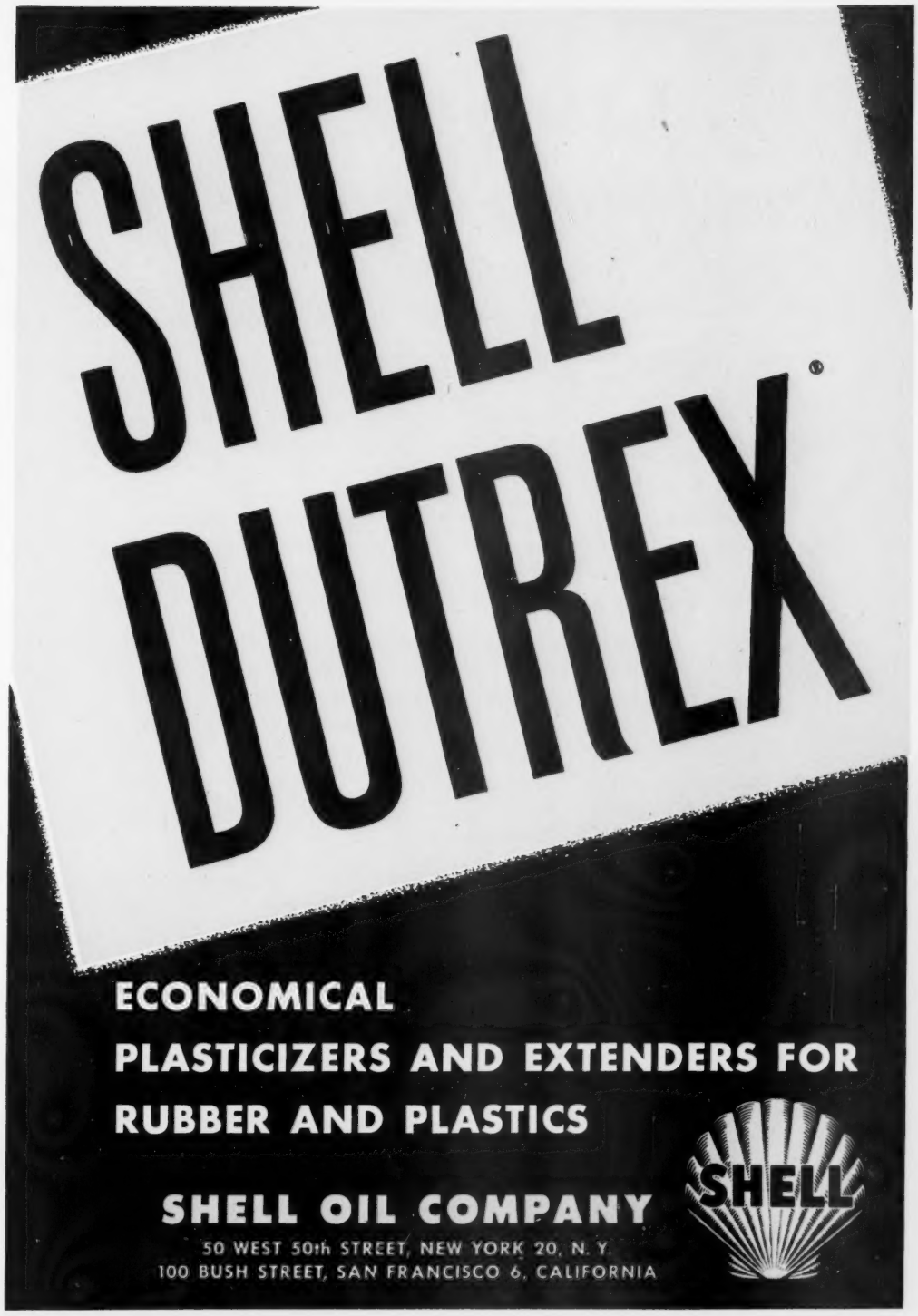
PLANTS AT AKRON, CANTON, ALLIANCE, CLEVELAND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MILLIONS

For Efficiency and Economy

Since originating the Capitol Process Liner Treatment, we have processed many million yards of cotton and rayon piece goods for all types of rubber companies.

These millions of yards of Capitol Liners have given efficient service for two reasons. First, we have usually finished a sample liner without charge so it might be tested on the job and thus ascertain its suitability for the purpose in mind. Second, production and repeat orders are always processed to the same uniform quality standards.

These millions of yards have resulted in untold economies in piece goods. Liners processed with our Capitol Treatment have a considerably longer life than those not treated. Therefore, purchases of piece goods have not had to be made so frequently and thus many, many yards of piece goods have been made available for other vital defense needs. Capitol Liners' longer life means that over a period of time, they literally "pay for themselves".

If you have not yet tried treated liners, why not consult us regarding a trial treatment on some of your liner material. We are always at your service and an inquiry or order will have our prompt attention.

Originators of the Capitol Process Liner Treatment

We also do the following types of finishing and we shall be glad to have you consult us regarding them:

1. Resorcinol Formaldehyde Latex processing on cotton, rayon, nylon and celanese to permit adhesion with rubber stocks.
2. Mildew Resistant Treatments; all widths and weights of belting, hose, number and army ducks.
3. Fire, Water, Weather and Mildew Resistant Finishing of number duck and U. S. Army duck to government specifications.

TEXTILE PROOFERS INC.

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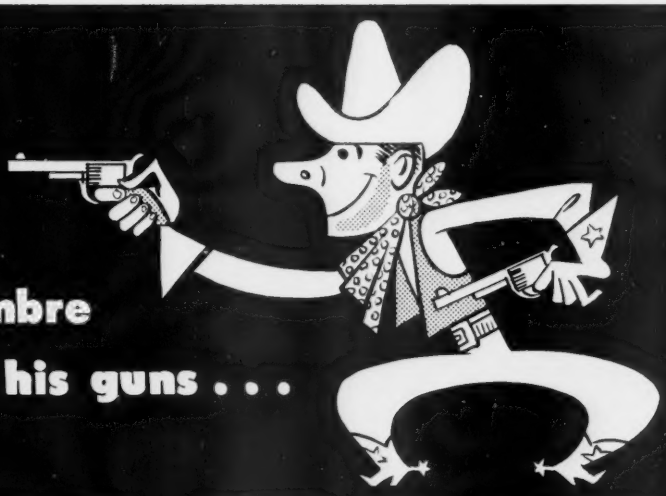
Bergen 3-6183



This Hombre
sticks to his guns . . .

TY·PLY

the RUBBER-to-METAL ADHESIVE
sticks for a lifetime!

TY-PLY **Q** or **3640** for bonding Natural, GR-S, and Butyl

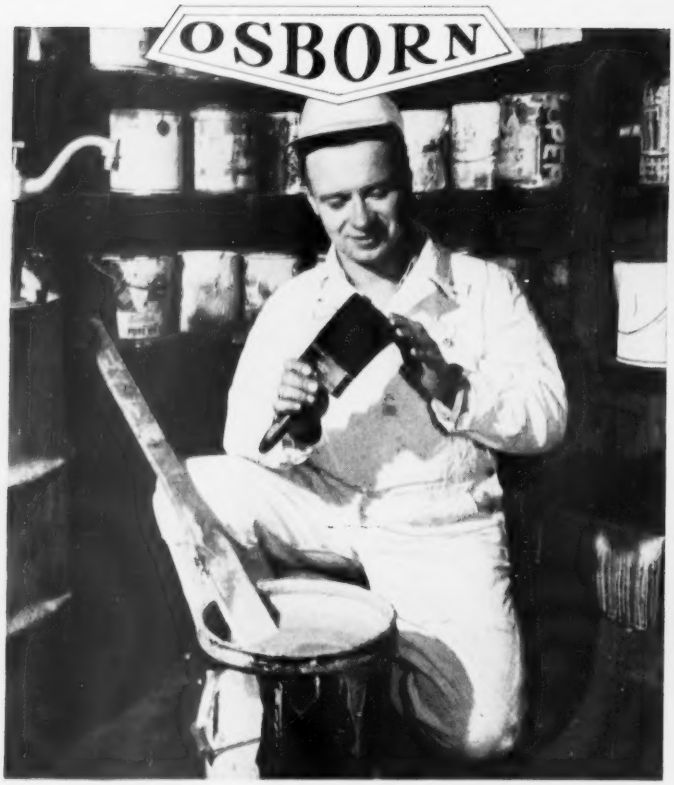
TY-PLY **S** for bonding Neoprene

TY-PLY **BN** for bonding N-types

TY-PLY will adhere most vulcanizable rubber compounds to almost any clean metal surface.

MARBON CORP.
GARY, INDIANA
SUBSIDIARY OF BORG-WARNER

TY-PLY has stood the test of time . . . . since '39



How to tell a good brush . . . just look for "OSBORN"

You know a brush is good when it bears the name "OSBORN."

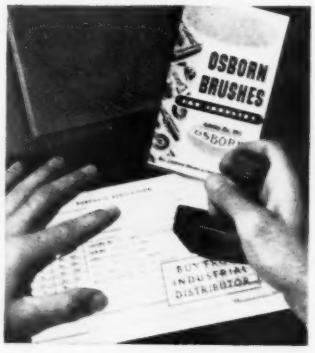
That simplifies buying. To assure unsurpassed quality in industrial brushes, all you need to do is *specify* "OSBORN." You can buy OSBORN paint, maintenance and power brushes with confidence because their workmanship and materials are backed by 60 years of OSBORN service to Industry. Order them automatically from your INDUSTRIAL DISTRIBUTOR on the same order as other mill supplies. *The Osborn Manufacturing Company, Dept. 695, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

SAVES TIME. Your Industrial Distributor carries a large stock of OSBORN brushes to supply you with the right type of brush promptly. Saves your time. The OSBORN Master* Sweep Floor Brush shown is a nationally recognized product.

SAVES TIME. Built for Industry by the company that knows Industry's problems, OSBORN brushes do their jobs thoroughly . . . and fast. Here, OSBORN Disc-Center* Wire Wheel Brushes speed up the removal of old paint and rust.



SAVES TIME. You can make one order cover OSBORN brushes and other leading-brand mill supplies when you buy from your Industrial Distributor. This standard practice streamlines your purchasing, cuts your supplies inventory, assures you good service on top quality products.

*Trademark

WHEN IT'S

PELLETEX

IT'S TOP PELLET QUALITY

All The Way

The rubber compounder who empties a bag of Pelletex into the Banbury Mixer can appreciate the value of uniformly well-formed pellets. Pelletex pellets are free-flowing, easy to handle, grit-free—and there's never any waste black left in the bottom of the bag. Unloading is easy and rapid, whether in bag or bulk, and there's less dust in mixing and less danger of contamination. Weighing is quicker and more accurate, and results in better standard rubber stocks.

Rubber manufacturers throughout the world have learned that the superior pellet quality of Pelletex SRF can mean economies of time and money. No other SRF carbon black can match this same pellet quality. That's why rubber manufacturers who want and need the best SRF specify Pelletex—as they have since 1928.

CABOT

The
GENERAL ATLAS Carbon Co.

77 FRANKLIN ST., BOSTON 10, MASS.

Herron Bros. & Meyer Inc., New York and Akron • Herron & Meyer of Chicago, Chicago
Raw Materials Company, Boston • H. N. Richards Company, Trenton
The B. E. Dougherty Company, Los Angeles and San Francisco
Delacour-Gorrie Limited, Toronto and Montreal

Have you tried

KP-555

with N-Type rubbers?

KP-555, Bis-(dimethyl Benzyl) Ether, imparts these qualities:

- excellent tack
- good plasticity
- low cost
- short mixing time
- easy extrusion

Manufacturers using acrylonitrile rubbers demand good building tack, easy fast mixing, and uniform plasticity even after hot processing.

You may have met these requirements in the past by compounding expensive plasticizers—thereby increasing your product costs.

If you're looking for a more efficient, lower-priced plasticizer to place your product in a competitive position KP-555 is the answer.

You have available in KP-555 a low-viscosity, relatively high-boiling liquid plasticizer. Its outstanding characteristics with acrylonitrile synthetic rubbers include excellent building tack, easy extrusion and impressively short mixing time.

Write today for technical data, test samples or other information on KP-555. Let our laboratories advise you on the best results obtainable with this superior product.

OHIO-APEX, INC.

Division of Food Machinery and Chemical Corporation

Telephone: Nitro 152 Cable Address: Ohopex

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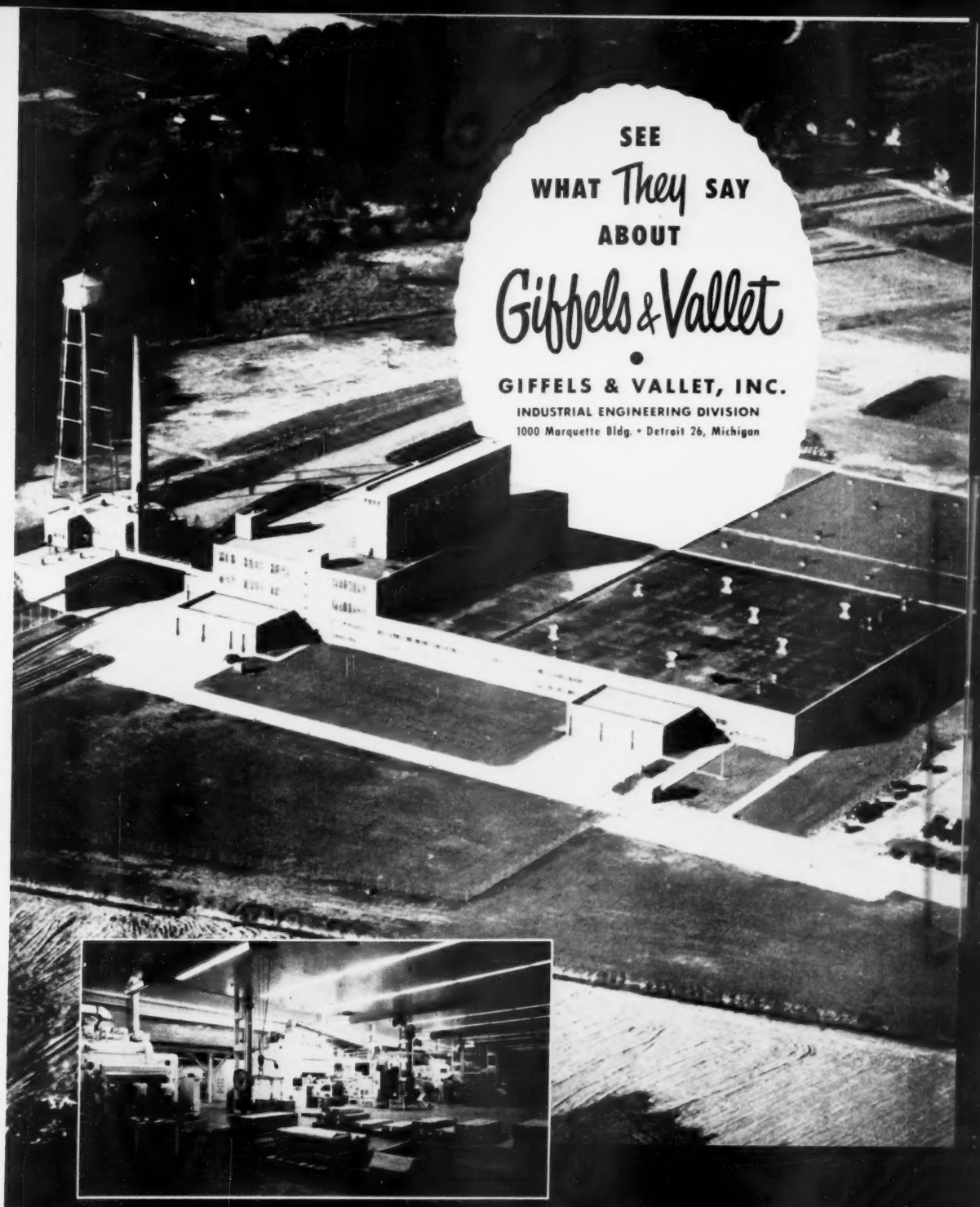

Bakelite Corporation · Vinylite Plant · Ottawa Ill.

There's an easier way
to separate SHEET or SLAB stock
and lots healthier, too!
"AQUAZINC" IS YOUR ANSWER!
Using elephants to pull sheeted stock apart would be novel — but using Aquazinc to *keep* it apart is lots smarter! Highly concentrated zinc stearate solution — Aquazinc is applied as a spray or dip — eliminating the health and explosion hazards of dusting — the need for liners or cushions. Developed especially for sheet-mill or slabbed stock, Aquazinc lubricates too, giving you a smooth-flowing stock plus perfect tack control. It is readily absorbed, without affecting the stock — leaves a glossy, non-greasy finish that adds appearance-appeal. Let us send a sample of Aquazinc to try in your own plant.
BEACON
PURITY · UNIFORMITY · DEPENDABILITY
Chemical Industries, Inc.
BOSTON 30, MASSACHUSETTS

Prevent Scorch!

End Bin Set-up!

In Neoprene Stocks With

SUBLAC PX-5

At last the rubber industry has an answer to the costly problems of set-up in bin storage and scorch in neoprene compounds. It's SUBLAC PX-5, an oil resistant, light colored, powdered resin.

Actual production experience has proved that only 10 parts of SUBLAC PX-5 on the rubber acts as a co-accelerator in all non-black neoprene stocks and prevents scorch in both process and bin storage stocks.

In addition, this amazing new material . . . SUBLAC PX-5 . . . gives a preservative quality to unvulcanized neoprene stocks and improves their physicals.

TEST SUBLAC PX-5 YOURSELF, FREE!

Write today for 5 lb. sample and test data. Once you've tried SUBLAC PX-5 in your stock you'll agree it's the biggest development yet in modern rubber processing.

Performs Equally Well In Natural and GR-S Stocks!

Versatile SUBLAC PX-5 eliminates the need for zinc oxide and accelerators in using basic fillers (Silene, whiting, etc.). For example, here is a typical formula and test results after a 10 minute cure at 325° F.

Formulation #83		*Test Results*	
GRS(X631)	100	Tensile psi	1200
Sulfur	3	Elongation %	250
Silene EF	75	Modulus @	
Neozone D	1	200%	990
SUBLAC PX-5	30	Hardness	88
POLYMEL C-130	7.50		

ALSO ASK ABOUT THESE QUALITY POLYMEL PRODUCTS:

GILSOWAX (solid)—Extender, Wire Compounds
SUBLAC RESINS (powders)—Hardeners, Stiffeners
POLYMEL 6 (solid)—Tires, Camelback
POLYMEL 7 (liquid)—Tires, Camelback, Carcass
POLYMEL D (solid)—Polystyrene-Indene Plasticizer
POLYMEL C-130 (solid)—Plasticizer
D-TAC (solid)—Non-coloring Detackifier

THE POLYMEL CORP.

1800 Bayard Street
Baltimore 30, Maryland
Phone: PLaza 1240

Representatives: **Eastern**—H. M. Royal, Inc., Trenton, N. J. **Western**—Merit-Western Co., Los Angeles, Calif.

Purecal—a GR-S and dollar-saver

William M. Moser (left) and Ed Hillendahl, Pacific Tire and Rubber Company executives, inspect GR-S carcass stock containing Wyandotte PURECAL.

"Wyandotte Purecal T improves over-all quality in GR-S tire stocks"

—William M. Moser, *Development Mgr.*

Pacific Tire and Rubber Company executive tells how this Wyandotte product gives higher tear resistance and good cord adhesion in GR-S carcass stocks:

"We demand the highest quality in our products," says Mr. William M. Moser, development manager. "A great deal of our research and development work is devoted to continual improvement of quality and maintenance of high standards.

"Our tests and subsequent experience, using Wyandotte PURECAL* T in GR-S carcass stock as a reinforcing filler, have shown PURECAL to be an exceptionally fine aid to quality. With it in our carcass stock, we get higher tear resistance, good cord adhesion between plies, excellent building tack, and improved quality of GR-S stock.

"Using PURECAL in our processing, we can run 100% GR-S stock on our 4-roll calender without the necessity of regrinding the rolls."

PURECAL is becoming an increasingly important ingredient in the manufacture of a wide range of rubber products, including tires, wire insulation, fire hose, and industrial belts. For technical assistance, samples, or a free copy of "PURECAL in GR-S," write to *Wyandotte Chemicals Corporation, Wyandotte, Michigan, or phone AVenue 2-5300, Wyandotte. Offices in Principal Cities.*

* TRADEMARK

Wyandotte
CHEMICALS

the man in seat 14

"Doc" MacGee says: While the rest of the world sleeps, this man rolls through the night on important business.

He's the Skellysolve Technical Fieldman . . . on his way to help a distant manufacturer solve a new or knotty problem . . . a problem involving the most efficient application of Skellysolve . . . to achieve more uniform and bigger production at less cost.

Trained, experienced trouble-shooters like this Skellysolve Technical Fieldman are "on call" for industrial users of Skellysolve. In other words, the Skellysolve Technical Fieldman is living proof that you get far *more* than a fine solvent when you buy Skellysolve.

You get a skilled engineering service that's bound to be reflected in comparative freedom from solvent worries . . . greater safety in manufacturing operations . . . and savings in your operating costs.

Urgent or routine, whatever your solvent problems may be—seek the advice of your Skellysolve Technical Fieldman for the right answers. Helping to overcome solvent problems is his business!

SKELLY **Skellysolve**

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI

Skellysolve

a leading name in solvents for more than 20 years

A pioneer in the development of close cut fractions, Skelly Oil Company is known for leadership in the engineering, development and marketing of solvents for industrial use.

Skellysolve is your password to dependability of supply . . . plus unsurpassed purity, uniformity, close boiling ranges and special properties to fit your particular needs. Write or wire for more complete technical information.

"I urge every American employer to promote the Payroll Savings Plan..."

DECHARD A. HULCY, PRESIDENT
Chamber of Commerce of the United States

"I urge every American employer to promote the Payroll Savings Plan among his employees as a means of building a reservoir of savings."

As President of the Chamber of Commerce of the United States . . . with literally thousands of contacts throughout industry and commerce . . . Mr. Hulcy is uniquely qualified to evaluate the Payroll Savings Plan.

As a business man, Mr. Hulcy puts his finger on a most important accomplishment of the Payroll Savings Plan: the enormous reservoir of savings, *future purchasing power*, built up by systematic saving.

Today, millions of Americans hold Series E Defense Bonds totaling $34.7 Billion. It will surprise many to learn that this figure is $4.8 Billion greater than on V.J. Day. And the $34.7 Billion total of outstanding Defense Bonds is mounting as more and more employers recognize the importance of the Payroll Savings Plan. During 1951 there was a sizable increase in the number of men and women saving through Payroll Saving Plans where they work.

During the calendar year 1951, 45,500,000 $25 Series E Bonds were purchased – a gain of 17% over the previous year. 12,000,000 $50 E Bonds were purchased in the same period, 14% over the previous year. $25 and $50 denominations are the bonds bought by Payroll Savers.

Building a reservoir of savings and future purchasing power . . . contributing to America's defense effort . . . helping to maintain America's economic stability by providing a check on inflationary tendencies, the Payroll Savings Plan is doing a three-way job.

If your company hasn't a Payroll Plan, or if your employee participation is less than 60%, the Savings Bond Division, U. S. Treasury Department will be glad to help you take your place among America's Honor Roll of "Companies on Payroll Savings". Phone, wire or write to Suite 700, Washington Building, Washington, D. C.

The U.S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

RUBBER AGE

...to be glamorized by TITANOX

Raw rubber gives little indication of having a glamorous future when you see it dockside.

Soon these bales will be transformed into gay, colorful swim suits, shower curtains, beach balls, floor tile, toys, and endless other products with the help of Titanox pigments. No other pigment can give such light or bright tints, or whites so white, in natural or synthetic rubber, as TiO_2.

There is a rutile or anatase Titanox pigment for any type of rubber compound. Just bring your problems to our Technical Service Department. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

® **TITANOX**

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

TITANOX

Where you stand with . . .

Marbon "8000"

Look what Marbon "8000" can do for your rubber compounds

- *Elimination of Masterbatching.*
- *Plasticizing action at processing temperatures.*
- *Lower power consumption on highly loaded stocks.*
- *Versatility with Natural, Synthetic and Reclaim rubbers.*
- *Higher unit reinforcement.*

Order Now! Stock Readily Available

Marbon

MARBON CORP.

GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

It BLENDS as it STRENGTHENS as it IMPROVES

If you're looking for a good general purpose stabilizer

...look to "Dutch Boy" DYTHAL

1. EXCELLENT HEAT AND LIGHT STABILITY: Dythal's high available basic lead content assures heat stability in processing. Its excellent ultra-violet light absorption makes for improved light stability in your finished product. It provides low tinting strength, and thus helps make bright colors possible.

"Dutch Boy" Stabilizers

PRODUCT	USE
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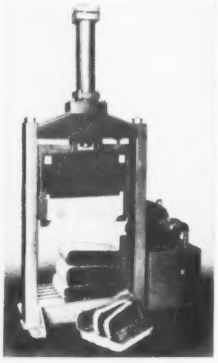

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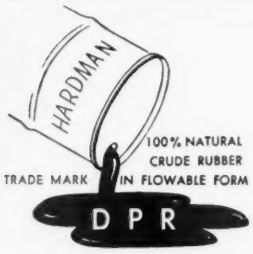

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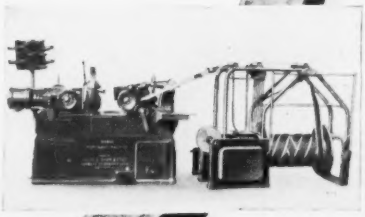

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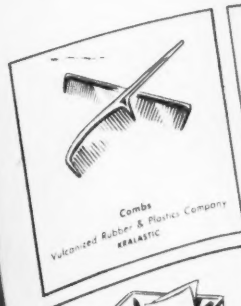

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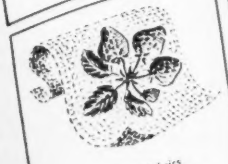

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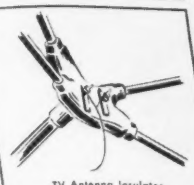

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RUBBER AGE

Vol. 71, No. 1 APRIL, 1952

Studies on the Vulcanization and Structure of Polyacrylic Rubber

By S. T. SEMEGEN and J. H. WAKELIN*

B. F. Goodrich Research Center, Brecksville, Ohio

THE field of acrylate chemistry has in recent years assumed a position of sizable importance. This field includes both monomers and polymers, esters, salts, amides, and even the free acid of acrylic acid or substituted acrylic acid, such as the methacrylic acid. While considerable use has been made of the resinous polyesters, such as polymethyl methacrylate, the rubber industry is especially interested in the more rubbery range of polyesters of acrylic acid.

Particularly is this true of polyethyl acrylate, whose physical properties in the raw or compounded polymer are more readily adapted to rubber processing equipment and finished goods specifications than other alkyl acrylates. In general, the polyacrylate esters have the characteristics indicated in Table I.

Note: This article is based on a paper presented by the authors before the Section on Elastomers and Plastomers at the XIIth International Congress of Pure and Applied Chemistry, New York, N. Y., September 10, 1951.

* Present address: Textile Research Institute, Princeton, N. J.

TABLE I—CHARACTERISTICS OF THE POLYACRYLATE ESTERS

Ester	Physical Appearance of Polymer
Methyl Acrylate	Horny, Resinous
Ethyl Acrylate	Tough, Rubbery
Butyl Acrylate	Soft, Tacky
Amyl Acrylate	Very Soft, Viscous
2-Ethyl Hexyl Acrylate	Soft, Tacky
Decyl Acrylate	Soft, Waxy

TABLE II—EFFECTIVE VULCANIZING AGENTS FOR POLYETHYL ACRYLATE

Sodium Meta Silicate Pentahydrate
Sodium Meta Silicate Nonahydrate
Sodium Hydroxide
Sodium Ortho Vanadate
Sodium Stannate
Potassium Hydroxide
Lead Oxide

While polyethyl acrylate has interesting properties, its highly thermoplastic nature reduces its utility as a specialty rubber. Further work in our laboratory disclosed certain effective vulcanizing agents. In view of the completely saturated chemical nature of the polymer, the conventional sulfur and accelerators useful in natural rubber or other diene rubbers were unsuccessful in converting the plastic to an elastic. New vulcanizing agents developed were those shown in Table II.

Subsequent to these studies, Fisher, Mast, Rehberg, and Smith at the Eastern Regional Research Laboratories published in 1944 their work on Lactoprene rubbers, disclosing acrylic ester copolymers containing vulcanizable unsaturation. These comprised methyl or

TABLE III—THEORETICAL AMOUNTS OF ETHYL ALCOHOL IN POLYETHYL ACRYLATE

	Wt. P.E.A.	cc. ETOH at 287° C.	cc. ETOH at 312° C.	% Theor.
(1) Uncured P.E.A.	300 g.	8.8 (13 days)	84.2 (20 days)	53
(2) Uncured P.E.A.+KOH	257 g.	71.5 (13 days)	0.0 (7 days)	47
(3) Cured P.E.A. (silicate)	248 g.	57.0 (13 days)	22.7 (11 days)	55

TABLE IV—CORRELATION BETWEEN THE SIDE GROUP SPACING d_1 AND THE MAIN CHAIN SPACING d_2

	Polyacrylates d_1 (A)	Polyacrylates d_2 (A)	Esters of Pimelic Acid d_1 (A)	Esters of Pimelic Acid d_2 (A)
Methyl	7.64	4.17	9.63	4.37
Ethyl	9.13	4.27	10.18	4.37
n-Propyl	10.25	4.37	10.80	4.37
Isobutyl	11.53	4.68		
n-Butyl	12.40	4.56	12.20	4.47
2-Ethyl Hexyl	14.10	4.56		

ethyl acrylate and polyfunctional comonomers, such as butadiene, isoprene, or alkyl maleate. These unsaturated polymers could be vulcanized by conventional methods, such as sulfur and accelerators.

Our interest was provoked by the mechanism of vulcanization of polyacrylate esters induced with sodium meta silicate, and to a less extent with lead oxide. X-ray diffraction patterns of various kinds of acrylic polymers were examined. In addition, certain gravimetric analyses of the products of vulcanization were made to gain insight.

The following vacuum distillations at 5 mm. pressure and temperatures up to 300° C. were run in the hope that identification of distillates resulting from these experiments would lead to a better understanding of the reaction involved during vulcanization:

1. Uncured P.E.A.
2. Uncured P.E.A. + 10% KOH + 7% H_2O
3. Cured P.E.A. containing 17% $Na_2SiO_3 \cdot 5\ H_2O$ + 3% H_2O

In Experiment 1, 300 grams of uncured P.E.A. was distilled under 287°C. for 13 days. Nine and eight-tenths cc. of distillate was recovered, of which 8.8 cc. was identified as ethyl alcohol and 1.0 cc. water. The temperature was then raised to 312° C. and distillation continued for 20 days more. One hundred twelve and seven-tenths cc. more distillate was obtained, of which 84.2 cc. was ethyl alcohol and 28.5 cc. unidentified (not water, but a dark colored high boiling fraction). In all, 53% of the theoretical amount of ethyl alcohol in P.E.A. was obtained.

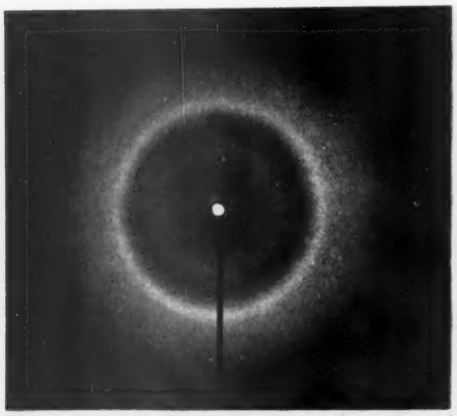
In Experiment 2, a 300 g. mill mixed sample containing 257.0 g. uncured P.E.A., 25.5 g. potassium hydroxide, and 17.5 g. of water was distilled for 13 days at 287° C. Eighty nine cc. of distillate comprised of 71.5 cc. ethyl alcohol and 17.5 cc. water was obtained. In all, 47% of the theoretical amount of ethyl alcohol in P.E.A. was obtained.

In Experiment 3, 300 grams of a silicate cured P.E.A. containing 248 g. P.E.A., 44 g. of sodium meta silicate, and 8 g. of water was distilled at 287° C. for 13 days. Fifty seven cc. of ethyl alcohol and 16 cc. of water was obtained. After 11 more days at 318° C., 22.7 cc. of ethyl alcohol and 7.6 cc. of an unidentified fraction was obtained. Fifty-five percent of the total theoretical amount of ethyl alcohol in P.E.A. was obtained.

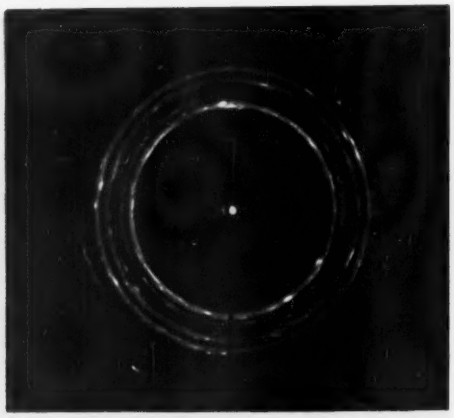
These results are tabulated in Table III. The results are interesting since they indicate that the raw polyethyl acrylate is substantially unaffected by prolonged heating at 287° C. However, up to 312° C. enough ethyl alcohol is liberated to be equal approximately to one out of every two ethoxy groups in the polymer chain.

Through the addition of KOH followed by heating up to 287° C. ethyl alcohol was readily produced to approximately the same ratio; one out of every two ethoxy groups. Therefore, KOH has acted as a catalyst to speed up liberation of ethyl alcohol, even at a lower temperature.

The sample of polyethyl acrylate previously vulcanized



1. Polyacrylic Acid



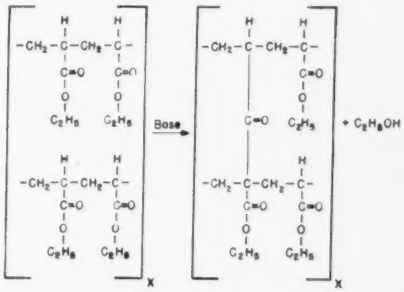
2. γ-Carboxy Pimelic Acid

FIGS. 1 and 2—X-ray diffraction patterns of polyacrylic acid and α-carboxy pimelic acid.

with sodium meta silicate for one hour at 280° C. gave up about the same amount of ethyl alcohol as before. However, it does show that while liberation of ethyl alcohol accompanies vulcanization, the alcohol remains associated with the polymer, possibly as a plasticizer, and, as evidenced in Experiment 3, is driven off only after extensive heating.

To be certain that all the water that is present in the curing agent (hydrated sodium meta silicate) could be removed during vacuum distillation, 54 g. of the silicate plus 9 g. of water were melted into a smooth paste and subjected to vacuum distillation. The theoretical amount of water was distilled over and identified.

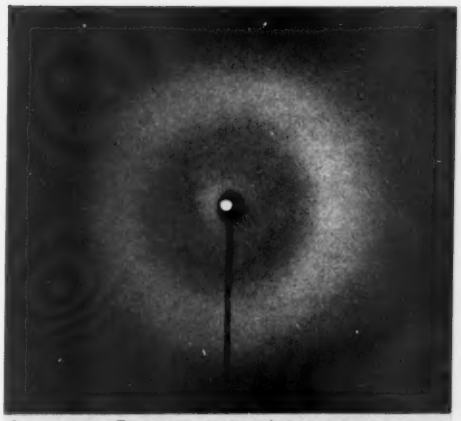
These experimental results are capable of interpretation in terms of a Claisen type condensation reaction. This reaction involves the hydrogen on an alpha methylene group of one molecule and an ethoxy group of another molecule resulting in the formation of ethyl alcohol and a cross linkage between two molecules. Bases will catalyze this type of reaction, in agreement with the experimental fact that several bases are acceptable vulcanizing agents for polyethyl acrylate. The more curing agent used the harder and tougher the vulcanizate, and presumably the greater the number of cross linkages produced between the polymer chains. This is shown below:



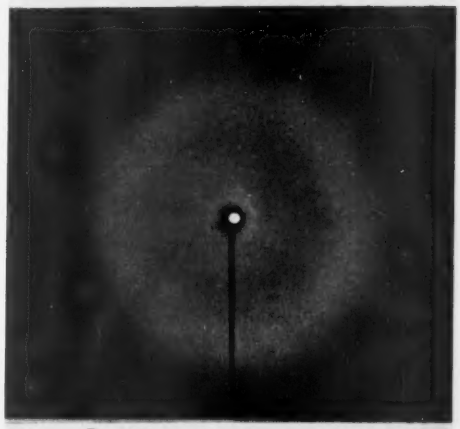
The importance of the alpha hydrogen atom is well demonstrated by the same distillations performed with polyethyl methacrylate, wherein a methyl group replaces the alpha hydrogen. In this case, vacuum distillation of 300 g. of raw polyethyl methacrylate yields only the monomer, ethyl methacrylate. Similarly, vacuum distillation as above with 255 g. of polyethyl methacrylate and 45 g. of sodium meta silicate again yields only the monomer ethyl methacrylate. Thus, it could be predicted that bases such as sodium meta silicate should not vulcanize polyethyl methacrylate. Indeed this prediction was verified in the following manner:

Eighteen parts of sodium meta silicate and 3 parts of water were milled into 100 parts respectively of polyethyl acrylate and polyethyl methacrylate, and subjected to press molding for one hour at 275° F. Samples were immersed in methyl ethyl ketone, a good solvent for unvulcanized polyacrylates. The polyethyl acrylate merely swelled, while the treated polyethyl methacrylate completely dissolved. In addition, the treated polyethyl acrylate maintained high strength and little flow at elevated temperatures such as 212° F., while the treated polyethyl methacrylate was very soft, thermoplastic, and flowed considerably. Both of these tests are conventionally used as criteria of vulcanization. A repeat trial was run on treated polyethyl methacrylate molded for 60 minutes at 340° F., but no difference was observed.

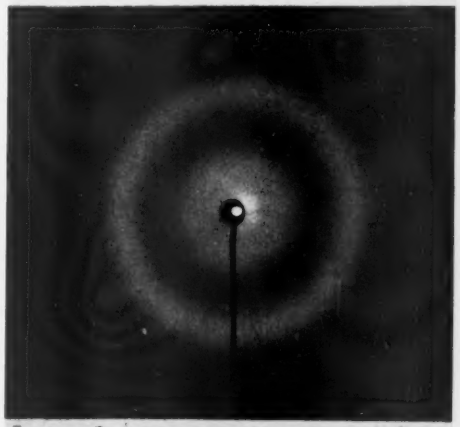
After observing these effects of vulcanization, x-ray diffraction patterns of various kinds of acrylic polymers were examined to determine their molecular structure



3. Plasticized with Water

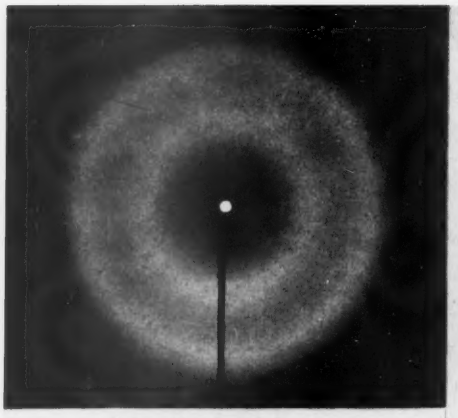


4. Plasticized with Methyl Alcohol

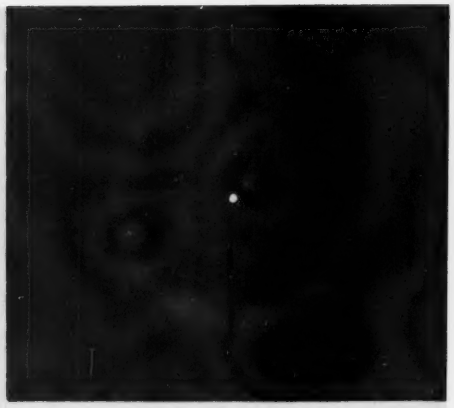


5. Plasticized with Ethyl Alcohol

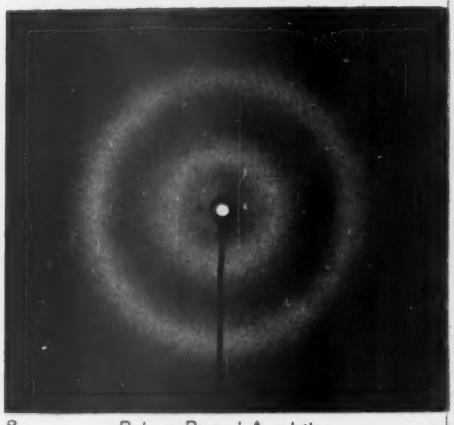
FIGS. 3 to 5—X-ray patterns of plasticized polyacrylic acid.



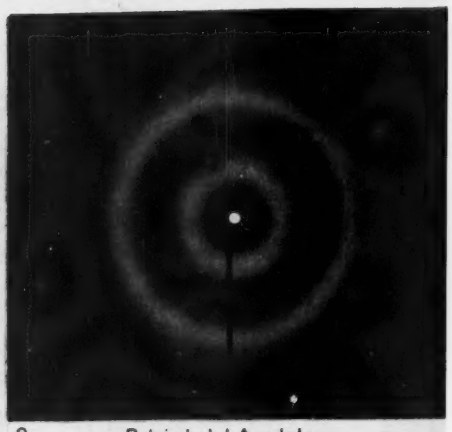
6. Polymethyl Acrylate



7. Polyethyl Acrylate



8. Poly n-Propyl Acrylate



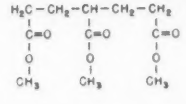
9. Polyisobutyl Acrylate

FIGS. 6 to 9—X-ray diffraction patterns of various polymers.

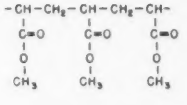
and to study the effects of cure on the molecular rearrangement.

The acrylate polymers, when stretched, are not crystalline. They have characteristic amorphous x-ray patterns consisting of two haloes, one related to the length of the side group and the other to a period probably along the main hydrocarbon chain. Table IV shows the correlation between the side group spacing d_1 and the main chain spacing d_2, varying the side group from polymethyl to poly-2-ethyl hexyl acrylate. For comparison with the polyacrylates the methyl, ethyl, n-propyl, and n-butyl esters of α-carboxy pimelic acid were studied. These liquid esters are similar to the polyacrylates in that they have the same side group chains and main hydrocarbon chain but are much smaller molecules.

The patterns of the esters of α-carboxy pimelic acid are strikingly similar to the polyacrylates, showing that the polyacrylates have a liquid-like structure. The structural configuration of the methyl ester of α-carboxy pimelic acid is shown below:



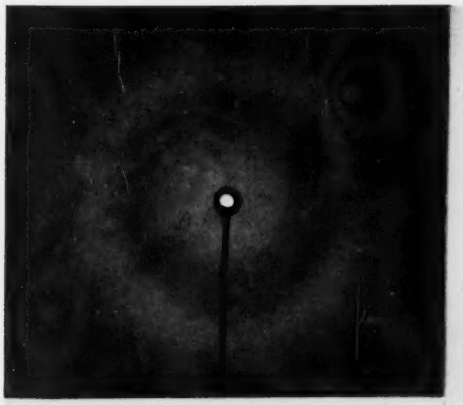
METHYL ESTER α-CARBOXY PIMELIC ACID



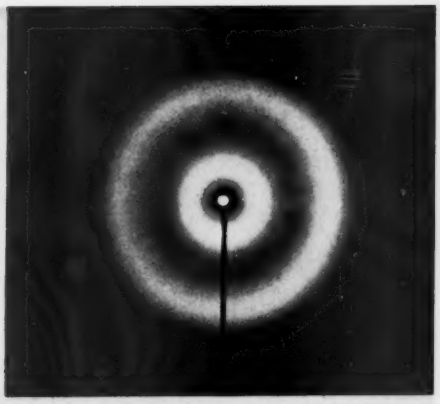
POLYMETHYL ACRYLATE

The d_1 spacing of the methyl ester of α-carboxy pimelic acid is about 2 A greater than that of polymethyl acrylate, indicating that the degree of packing of the molecules in the liquid is not as high as that in the polymer. As the length of the side group on the liquid esters is increased, the spacings approach those for the corresponding polyacrylates.

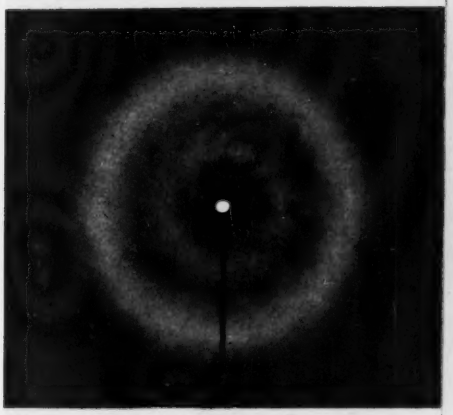
The same corresponding polymethacrylates were studied by electron diffraction patterns and x-ray diffraction. The main chain spacings remained rather constant and of the same magnitude as the polyacrylates.



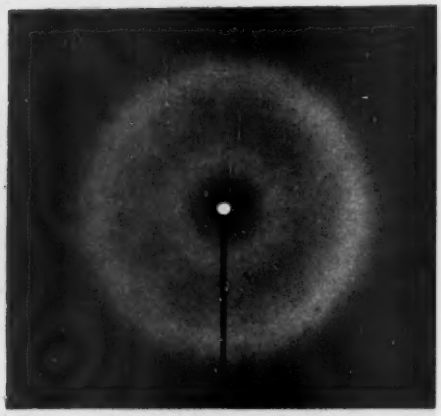
10. Poly n-Butyl Acrylate



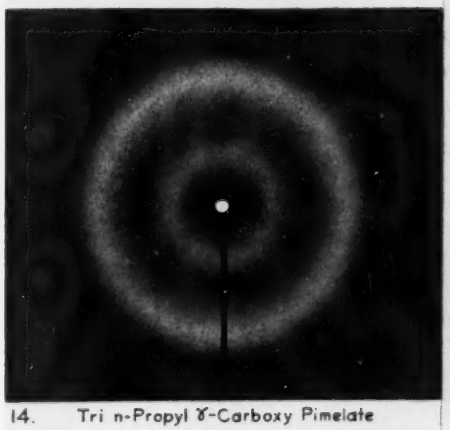
11. Poly 2-Ethyl Hexyl Acrylate



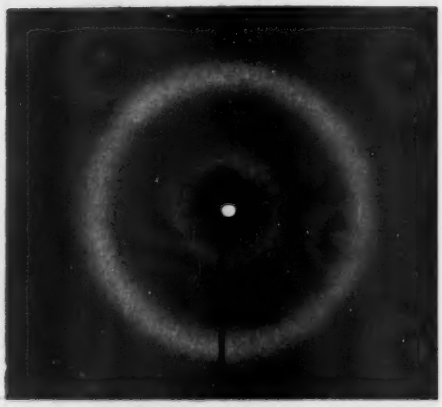
12. Tri Methyl γ-Carboxy Pimelate



13. Tri Ethyl γ-Carboxy Pimelate



14. Tri n-Propyl γ-Carboxy Pimelate



15. Tri n-Butyl γ-Carboxy Pimelate

FIGS. 10 to 15—Additional x-ray diffraction patterns of various polymers.

Table V—X-Ray Results on Plasticized Polyacrylic Acid Samples

Plasticizer	d_1 (A)	d_2 (A)	Corresponding d_2 (A) Acrylates
None	8.7	5.44	——
Water	—	5.24	——
Methyl Alcohol	—	4.24	4.17
Ethyl Alcohol	—	4.37	4.24
Propyl Alcohol	—	4.62	4.37
Butyl Alcohol	—	4.90	4.56

The side groupings showed a similar increase in spacings as the ester increased from methyl to n-butyl methacrylate.

If the simplest polymer, polyacrylic acid, is examined, it yields an x-ray diffraction pattern having fairly sharp rings (Figure 1). The dry polymer is a brittle, hard and horny material. α-carboxy pimelic acid is a tightly bound crystalline compound. Its x-ray diffraction pattern is shown in Figure 2.

The similarity between the polyacrylates and the liquid esters of α-carboxy pimelic acid is important because it shows:

(1) That the x-ray patterns of the polyacrylates can be simulated with liquid compounds of like structure.

(2) That the spacing increase of the inner halo with length of the side chain is confirmed for liquids as well as for the polyacrylates.

(3) That the replacement of an alkyl group by hydrogen on the side group increases interchain binding sufficiently to produce a crystalline compound in α-carboxy pimelic acid and a hard resinous glass in the case of polyacrylic acid.

X-ray work on polymethyl acrylate vulcanized with sodium m-silicate showed that the long spacing (d_1) increased on cure from 7.6 A to 8.3 A. From the x-ray work on polyacrylic acid and α-carboxy pimelic acid, the effect of hydrogen binding on the structure was found very important. In order to relate cross-bonding with hydrogen to structural changes in molecular order, polyacrylic acid was studied with various plasticizers.

When polyacrylic acid is plasticized with water, there is a marked change in structure, the polymer becomes rubbery and the x-ray pattern (Figure 3) shows that the high degree of order in polyacrylic acid is broken down by the association of the side groups with water. The structures plasticized with alcohol are similar in x-ray pattern (Figures 4 and 5) to those of the acrylates, though they have no regular long interchain distance (d_1). X-ray results on plasticized polyacrylate acid samples are shown in Table V.

On heating the plasticized samples, all of the water and alcohol cannot be driven off. Although not a complete return to the polyacrylic acid structure is obtained, the samples become hard and brittle when the side chains are reassociated through hydrogen bonding.

A copolymer of 90% methyl acrylate and 10% acrylic acid was studied. This polymer is stiffer than uncured PMA. The long interchain spacing of the polymer is lower than PMA by 0.9 A while the alcohol plasticized sample is higher than PMA by 1 A. X-ray data in Table VI show the effect of 10% acrylic acid and the large change obtained when the polymer has taken up alcohol.

The alcohol plasticized copolymer agrees with cured PMA in d_1 spacing. The observed increase in spacing of PMA on cure is probably due to the presence of methyl alcohol in the sample.

Ethyl acrylate shows no change in d_1 spacing on vulcanization. The 90/10 copolymer of ethyl acrylate and acrylic acid showed a decrease in d_1 spacing from uncured PEA, but the plasticized samples did not change the d_1 spacing (Table VII). Since the PEA spacings are not sensitive to copolymerization with acrylic acid and subsequent plasticizer action as in PMA, it is evident that no large change should be observed in cured PEA samples.

The change in side chain distance of polymethyl acrylate on curing showed the cure to be related to a side chain reaction. The results with polyacrylic acid and copolymers of methyl acrylate and acrylic acid indicate that a cure might result from side chain association through hydrogen bonding. Such a cure would be extremely sensitive to hydrolysis.

The vulcanization would have to proceed first by hydrolysis, then followed by association. Caustic or sodium m-silicate hydrate can be used as a hydrolyzing agent. The association can result by hydrogen bonding of the hydrolyzed side groups or by formation of a primary bond with lead oxide between side chains. Compounds which vulcanize by hydrolysis alone would be unstable against high humidity aging since the association between side groups can be broken up by association of these groups with water. With lead oxide, a hydrolyzed structure is required, which would allow the lead oxide to form a primary lead bond between chains. The amount of lead oxide required for a good cure would depend on its effectiveness as a hydrolyzing agent. In view of the fact that larger quantities of lead oxide were used, it is probably not as effective a hydrolyzing agent as sodium m-silicate. Similarly, sodium m-silicate cured polyacrylates should be more sensitive to exposure in water than the lead oxide cured polyacrylates. This supposition was shown experimentally to be valid.

Table VI—X-Ray Data Showing the Effect of 10% Acrylic Acid on Methyl Acrylate Polymers

Sample	d_1(A)	d_2(A)
PMA—Uncured	7.6	4.17
PMA—Cured	8.4	4.17
PMA—Plasticized with methyl alcohol	8.0	4.17
MA-Acrylic acid (90/10)	6.7	4.17
MA-Acrylic acid—Plasticized with methyl alcohol	8.6	4.15
MA-Acrylic acid—Plasticized with ethyl alcohol	8.5	4.20

Table VII—X-Ray Data Showing the Effect of 10% Acrylic Acid on Ethyl Acrylate Polymers

Sample	d_1(A)	d_2(A)
PEA—Uncured	8.8	4.24
Ethyl Acrylate-Acrylic acid (90/10)	8.4	4.24
Ethyl Acrylate-Acrylic acid—Plasticized with water	8.5	4.24

Conclusion

Several characteristic features of the vulcanization of polyacrylates have been demonstrated. The fact that alcohol is formed and liberated during cure has been demonstrated; this finding might favor a Claisen type

condensation. On the other hand, the fact that a copolymer of methyl acrylate and acrylic acid can be plasticized with alcohol and assumes a chain spacing comparable with that of cured polymethyl acrylate, whereas the uncured PMA and unplasticized copolymer are appreciably different in chain spacing, might favor a controlled hydrolysis and hydrogen association as the mechanism. The latter mechanism would be more compelling if the methyl acrylate/acrylic acid copolymer when alcohol plasticized showed other evidences of vulcanization, *in situ*, such as increased resistance to methyl ethyl ketone or reduced thermoplasticity in addition to increased rubberiness.

Several different x-ray diffraction patterns are shown in Figures 6 to 15. Note the progression in spacing for the inner halo as the number of terminal carbons in the side chain is increased.

In comparing the pattern of α-carboxy pimelic acid, a highly crystalline compound, with the patterns of the esters of the acid, we note the influence of hydrogen binding on the side chain association to produce a regular 3 dimensional structure, while esterification with relatively non-reacting alkyl groups decreases cross bonding between chains so much that the structure assumes a liquid configuration similar to that of the various polyacrylates.

Special Report on Two Avoidable Accidents in Rubber Plants

THE Rubber Section of the National Safety Council recently reported two cracker mill accidents which occurred in rubber plants, both of which bring out two very important points with respect to mill safety, i.e., insufficient training and experience and substandard or unsafe equipment. In both cases there is evidence of lack of training and experience, emphasizing the importance of a formal written training program, while both give evidence of inadequate mechanical protection, pointing up the need for eliminating substandard mills.

The first case involved a man 29 years of age who, after one week of training as a cracker operator, was assigned to a cracker under the supervision of an experienced operator. He and the regular operator had completed the initial cracking operation which consists of passing the pigs through the cracker once, and they had started the warm-up operation and had just finished tightening the roll. No one saw the injured man get caught in the mill. The injuries necessitated amputation of the hand.

This cracker was substandard with 18-inch rolls. A barrier safety bar had been installed three years before the accident. A 14-inch wide vertical offset was made in the center of the bar to permit easier feeding into the bite. The injured man stated that when he began warming up he picked up the end as it came through the cracker and placed it on the front roll. The bank came down on his right hand pulling it into the bite. The offset has now been removed and the bar has been raised high enough to permit the pigs to be fed through the cracker. Plans are now under way to bring this cracker up to standard height.

The second accident involved an operator who was working on the smooth roll side of a cracker mill. At the same time, another operator was working on the opposite side. As the injured pulled the stock from under the mill and up over the smooth roll, his gloved left hand became caught in a fold of the rubber. Four fingers of the left hand were crushed, necessitating amputation.

When a take-away conveyor had recently been installed on this mill, part of the safety cradle was removed to accommodate it. This left an opening on the right end of the mill wherein a man could be caught. The injured man was working at this unprotected end of the mill. He was allowing his left hand to follow the stock up over the top of the mill roll as he was feeding it into the bite. When the stock folded over his gloved left hand, he could not reach the safety cradle with his free right hand.

Some Applications of Lignin in the Rubber Field

OVER a period of years a number of articles have appeared both in technical publications and in the lay press on various uses of lignin, often referred to as the problem child of the chemical wood pulp industry. The following data on some of the applications of lignin in the rubber field was taken from data prepared by J. J. Keilen and P. R. Wiley of the Development Department of the West Virginia Pulp & Paper Co., Charleston, South Carolina.

Mixtures of alkali lignin and rubber latex serve as a means for modifying the properties of certain paper products. Heavy, stiff paper board can be rendered more flexible, yet stronger, by adding the lignin and latex to the pulp before sheet formation or by saturating the formed sheet with the mixture before drying. A decrease in quantity of rubber consumed also results. The combination of lignin and latex has also found use as a binder for glass fibers and in other latex adhesives. Tests indicate that lignin strengthens unsupported rubber latex films and foam sponge rubber.

The ability of alkali lignin to strengthen or reinforce rubber is the basis for a very promising development. By dissolving the lignin in alkali, mixing the solution with rubber latex, coprecipitating the lignin and rubber, drying, and then compounding and curing in the conventional manner, excellent properties are obtained. The process has been tested with GR-S, high styrene resins, nitrile rubbers, neoprene, and natural rubber. In all but neoprene, rubber having tensile strengths equal to those obtained with carbon black are obtained. The light weight of lignin is of decided advantage. Colored rubber goods of high strength can be prepared. The most promising applications for lignin-rubber coprecipitates are in shoe soles and mechanical goods, with tires a possibility.

Further advantage is taken by the rubber industry of the precipitation of alkali lignin with acid. Sodium lignate is a good dispersing agent and is used as such for preparing dispersions of carbon black for the process of black masterbatching with GR-S. When the usual coagulation of the rubber is carried out, the lignin is precipitated and deactivated as a dispersing agent. Other dispersants remain active in acidic solution and occasion difficulties in further processing.

Quantitative Determination of Copper in Natural Rubber

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National Bureau of Standards, Washington, D. C.

A procedure is recommended in which small amounts of copper in rubber can be measured quantitatively by determining the depth of color of a copper-carbamate complex in a carbon tetrachloride solution. The complex is formed in an alkaline solution prepared from an acid extract of the rubber ashed at 550° C. This procedure yields results which are believed to be as reliable as those obtained by the more tedious and time-consuming wet-oxidation process of the A.S.T.M. Fading of the color of the carbamate solutions, which is occasionally reported in other procedures, does not interfere. The loss of copper during the removal of iron by precipitation is also eliminated.

THIS paper describes the method currently in use at the National Bureau of Standards for the quantitative determination of copper in natural rubber and latex. It involves the dry-ashing procedure for the destruction of organic matter and the subsequent preparation of a copper carbamate complex which is measured colorimetrically by means of Nessler tubes or by a photoelectric photometer. The procedure was formulated as a result of considerable experimentation with existing methods of copper analysis and with techniques used in other rubber procedures. It incorporates those portions of existing methods which have been found to be the most suitable as to accuracy and simplicity. The present investigation includes the study of some possible sources of error in the method of analysis. It also compares the wet-digestion with the dry-ashing methods of destruction of organic material.

A number of different procedures have been published for the quantitative determination of copper in rubber. Because of its greater simplicity the dry-ashing technique is often used in many laboratories in spite of the fear of losing some of the copper. Several authors *(3, 4, 9, 12, 15, 19)* recommend burning the rubber at as low a temperature as possible. Many others, however, believe that copper may quite easily be lost during any ignition procedure, and as a result standardization organizations usually recommend the wet-oxidation method *(1, 5)*.

Most analytical determinations for small amounts of copper involve a color reaction. Several complex-forming reagents for the color reaction have been studied *(17)* but sodium diethyldithiocarbamate, probably first used by Callan and Henderson in 1929 *(6)*, is the reagent most frequently used. Zinc diethyldithiocarbamate has been recommended by Poulton and Tunnicliffe *(16)* because of its greater solubility in organic solvents than the sodium salt, but it is not generally available. While the colorless zinc carbamate complex can be used as a reagent in place of the sodium carbamate salt, the presence of zinc salts in quantities normally found in compounded rubber will interfere with the formation of the copper complex. This interference by zinc is not easily detected, and cannot be avoided except by separating the metals.

Van der Bie *(3)* separates copper from the interfering elements by microelectrolysis or by precipitation as the sulfide. Several authors *(10, 13)* recommend the removal of manganese by precipitation as the dioxide in ammoniacal solution, though judging by Dekker's results *(9)* the amount of manganese usually found in rubber (less than 0.001%) would not interfere with the copper analysis. Cassagne *(7)* uses disodium phosphate in an ammoniacal medium to form a complex with iron, and then extracts the copper complex from the aqueous solution by means of ether or isoamyl alcohol. The method most often used for separation of the iron involves its precipitation as the hydroxide, but this procedure has the disadvantage of tending to remove some of the copper with the precipitate *(9)*.

Since cyanide solutions will decolorize copper carbamate solutions without affecting the color of iron or manganese carbamate, the color due to copper can be taken as the difference between that of the carbamate solution and that of the solution subsequently treated with cyanide *(16)*. This procedure is more rapid than physically separating the iron and the copper, and would be a recommended procedure if large quantities of manganese or iron are present in the rubber.

Fowler *(12)* presents a procedure for latex rubber which closely resembles the one recommended here, but he does not report its limitations and possible inaccuracies.

Recommended Procedure

The procedure recommended for the quantitative determination of copper in the rubber is as follows:

A 10-g sample of rubber is weighed, wrapped in a 15-cm piece of "ashless" filter paper, and placed in a No. 2 Coors porcelain crucible (50 ml) with clean unetched inside walls. The crucible is placed in a muffle furnace maintained at 550° C., and the door is closed. Since inflammable vapors are evolved, the furnace should not be opened during the first hour.

The sample is ashed until no carbon specks are visible. This usually requires from two to three hours. The crucible is removed and cooled, and 30 ml of a mixture of one part concentrated nitric acid to two parts of water is added. The contents of the crucible are digested on the steam bath for one-half to one hour, transferred to a beaker, and diluted to 150 to 250 ml, and then filtered. Twenty ml of 15% citric acid is added to the filtrate, and the solution brought to pH 9 by adding a mixture of equal quantities of water and concentrated ammonia.

The solution is cooled, and 20 ml of an aqueous solution of 0.1% sodium diethyldithiocarbamate is added. The suspension is allowed to stand 10 to 20 minutes, and is

Note: This article is based on a report presented at a meeting of Subcommittee XII on Crude Natural Rubber, Committee D-11 on Rubber and Rubberlike Materials, American Society for Testing Materials, Washington, D. C., February 27, 1951.

then extracted with three or four 10-ml portions of carbon tetrachloride. The last extract should be colorless. The extracts are combined in a glass stoppered bottle, and dried by shaking with a few grams of anhydrous sodium sulfate.

After standing for one-half to one hour, the solution is filtered into a 100-ml volumetric flask along with a two or three 10-ml rinsing of the desiccant. The solution is then made up to volume with carbon tetrachloride, and the absorption determined by the use of a Fisher Electrophotometer and its standard blue filter which has a maximum transmission at 425 millimicrons.

The maximum absorption of the carbamate complex occurs at approximately 440 mμ but a filter of broad transmission is satisfactory and green filters are recommended, rather than blue, when visual photometers are used, because of the increased visual acuity at the longer wave-length *(11)*.

A blank consisting of the reagents used is carried through the procedure with each group of samples.

The carbamate reagent solution should be protected from the light and renewed every two or three weeks. A pronounced mercaptan odor indicates that the carbamate has decomposed, and fresh reagent should be prepared. The solutions containing the copper complex should be protected from the light, and an occasional sample checked after two hours to determine if fading is occurring. When fading does occur, it can usually be blamed on old and presumably weakened solutions of carbamate.

A calibration curve of the electrophotometer, using the A-scale reading for absorbancy versus copper content, is established by using the reagents to be used in the analyses and adding to the nitric acid solution 0, 1, 2, 5, and 10-ml portions of freshly prepared copper sulfate solution containing 0.00001 g of copper per ml. This dilute solution is stable for several months if 0.1 to 1.0% sulfuric acid is added and the solution is kept in pyrex glass *(18)*. With carbon tetrachloride the maximum A-scale reading using the standard 23-ml cells with a 22-mm path should be less than 30 if the absorption curve is to be a straight line. Aliquots should be taken of samples which contain more than 0.00005 grams of copper.

Although most of the analyses for copper in rubber latices done in the course of this work have been performed by ashing dried films of rubber made from these latices, a more recent and simpler procedure is recommended which ashes the liquid latex directly. A weighed sample of latex is placed in a cone of ashless filter paper in a porcelain crucible, and sufficient ashless filter pulp is added to absorb the latex. The ashing procedure is then followed as previously described. Detailed procedures for the recommended ashing methods of both dry rubber and rubber latex are described in another publication *(11)*.

Experimental Work

Various experiments and analyses were performed in order to study possible sources of error in the procedures.

Loss of Copper on Ashing: By heating 1-g samples of copper chloride salt at 550° C. it was found that the loss of weight amounted to about 1% per hour. The double chloride of copper and potassium, $CuCl_2 \cdot 2KCl$, at 550° C. evaporated or decomposed at a rate of 0.3% per hour. When using milligram portions of the double chloride, and determining the copper content colorimetrically, the loss of copper during 18 hours of heating at this temperature amounted to only 5% total, or about 0.3% per hour.

It was found that the ash from the rubber samples had a tendency to stick tightly to the walls of etched crucibles, and that the copper could not always be dissolved quantitatively. A similar difficulty with etched silica crucibles was reported by Conerie *(8)*. A few tests using platinum crucibles also indicate incomplete recovery of copper from the ash. It is therefore recommended that porcelain or Vycor crucibles be used and that they be replaced by new ones when the inside surface has become etched. A pad of ashless filter pulp or paper under the sample prolongs the useful life of the crucible.

A comparison was made between the dry-ashing and the wet-oxidation procedures, using 10-g samples of pale crepe rubber with known quantities of added copper. Both methods made use of measuring the absorption of carbon tetrachloride solutions of the copper-carbamate complex. Results of the analyses for copper, expressed in parts per million, are as follows:

Sample	A	B	C	D
Cu added, ppm	0	10	50	100
Cu found by dry-ashing, ppm	3.0	13.0	54.2	104.5
Cu found by wet-oxidation, ppm	3.0	13.0	55.0	104.5

Other samples of rubber with no added copper were analyzed for copper by the same two methods, with the following results:

Sample	E	F	G	H
Cu found by dry-ashing, ppm	3.0	3.3	5.1	6.1
Cu found by wet-oxidation, ppm	3.3	3.3	5.4	6.0

Comparisons of the results in the above data show that there is no significant difference between the results obtained by the dry-ashing procedure used and those obtained by wet oxidation, and that if copper is lost during the dry ashing procedure, it is not measurable.

When the organic matter of the rubber was to be destroyed by wet oxidation, a procedure of the British Standards Institution was used *(5)*. The sample was heated with nitric acid in a Kjeldahl flask. After the first reaction had subsided, sulfuric acid was added to the solution and portions of nitric acid added when the refluxing solution darkened. When the solution ceased to change color on loss of nitric acid, portions of hydrogen peroxide solution were added to the slightly cooled acid solution until the color of organic material was destroyed.

Error from Iron Contamination: The A.S.T.M. procedure *(1)* requires the removal of iron by precipitation before the preparation of the copper carbamate. The solution from the acid digestion is neutralized with ammonia. The iron precipitated is removed by filtration, redissolved, and reprecipitated to remove adsorbed copper. This loss may not always be recovered completely by performing the extra steps of redissolving and reprecipitating the iron, as is shown below:

Sample	Treatment of Iron	A-Scale Reading Carbamate Complex Extracted with CCl_4	Recovery of Copper (%)
Reagent blank	——	4.1, 4.3	——
0.014 g. Fe	citrate added	4.3, 4.3	——
0.0001 g. Cu	——	17.3, 17.3	——
Cu and Fe	citrate added	17.5, 17.1	100
Cu and Fe	precipitated	12.0, 14.0	65, 75

The presence of iron in the rubber also gives a color which influences the reading of the absorbancy of the copper-carbamate complex, even in the presence of citric

acid. It was found by experiment that in an aqueous dispersion with added citrate, iron has about 1% as much effective absorption as copper. This is illustrated by the following data in which measured quantities of the copper and iron are compared visually as aqueous dispersions to give equivalent color:

Concentration of Solution	Visual Equivalents of Solutions A	B	C	D
Cu, 0.00001 g/ml	0.2 ml	0.4 ml	0.6 ml	1.0 ml
Fe, 0.001 g/ml	0.3	0.5	0.7	0.9

However, when the complex has been extracted by carbon tetrachloride, a much higher ratio (of the order of a thousand) of iron to copper in the original sample of rubber is required to produce an equivalent color. This was shown by an experiment in which the same iron and copper solutions were used as before, the concentration of the iron solution being 100 times that of the copper solution. The absorbancy of different quantities of these solutions made up to the same volume are given in the following table:

	A	B	C	D	E
Volume of metal solution, ml	0	2.0	4.0	6.0	8
A-Scale reading Cu soln. (corrected for blank)	0	7.5	18.3	27.5	38
A-Scale reading Fe soln. (corrected for blank)	0	1.0	2.0	3.0	fog
Ratio	—	7.5	9.1	9.1	—

This agrees approximately with the results of Poulton and Tunnicliffe *(16)*.

Error Caused by Variation in the Color of Aqueous Dispersions: The A.S.T.M. procedure measures the color of the carbamate complex in the aqueous medium, which is prevented from settling by the addition of a protective colloid such as gum arabic. However, absorption measurements on dispersions in aqueous media are difficult to reproduce from one time to another, varying with very slight differences in the reagents or the manner of preparation. Procedures in which the absorption of a solution of the complex was determined in an organic solvent were found to be more reproducible.

In the procedure recommended here, the carbamate complex was extracted from the aqueous solution by carbon tetrachloride. Other solvents such as butyl acetate and petroleum ether were also found to be satisfactory. The complex is more soluble in butyl acetate than in carbon tetrachloride, and is less soluble in petroleum ether. Petroleum ether does not extract the complex from water dispersion except in the presence of a large excess of citric acid. The carbon tetrachloride extraction is not only easily performed, but its extract is more easily dried than those made with the other solvents.

Error Caused by Fading of Color of Carbamate Complex Solution: It was found necessary to have the carbon tetrachloride solution dry before absorbancy measurements are made. During the drying process the absorbancy decreases as much as three A-scale units as the turbidity of the solvent is decreased by the removal of water. After the solvent has been dried, the absorbancy does not change appreciably for several hours, if the recommended procedure is used. In 24 hours the fading produces a decrease of absorbancy of from 10 to 20%. The addition of a large excess of carbamate is recommended in the procedure in order to avoid fading in the course of the determination.

Conclusions

A procedure is recommended in which small amounts of copper in rubber can be measured quantitatively by determining the depth of color of a copper-carbamate complex in a carbon tetrachloride solution. The complex is formed in an alkaline solution prepared from an acid extract of the rubber ashed at 550° C. This procedure yields results which are shown to be as reliable as those obtained by the more tedious and time-consuming procedures involving the wet-oxidation process which are presently recommended by standardizing organizations.

The use of an organic solution rather than an aqueous suspension gives better reproducibility, permits easier use of a photometer, and reduces the interference due to iron by a factor of ten.

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Report of An Avoidable Accident

A worker was trying to remove some cords that were wrapped around the end of the squeeze rollers on the front end of the pre-dip unit while the equipment was running. In doing so, the loose cords caught his right hand and pulled it between the front squeeze roller causing laceration to his upper right hand. This worker had been instructed before the accident that he was never to remove anything from the rollers when the machine was in operation. As a result of the accident, an additional safety cable has been installed at the bite of the pinch rollers.

NSC Rubber Section

Neoprene Solutions

By A. MITCHELL

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NEOPRENE was introduced approximately twenty years ago as an oil-resistant rubber which was superior to natural rubber in resistance to degradation caused by sunlight, heat, oxygen and weathering. Since that time continued research has resulted in the development and commercialization of a number of neoprene polymers. Each polymer has specific characteristics which make it particularly useful for certain applications, but the basic properties of resistance to oil and to degradation have been maintained, and it is these properties which have led to the widespread use of neoprene.

In solution compounding where a large volume of neoprene is used in adhesives and coatings the basic resistance of neoprene to degradation is of importance but it is usually other unique characteristics of neoprene which lead to its use.

It was realized at an early date that the resistance to chemicals, to oils, and to weathering which is exhibited by neoprene are characteristics which are highly desirable in protective coatings. Early attempts to prepare protective coatings from neoprene, however, were not successful, since high solids solutions could not be prepared, and an excessive number of coats were required to build up sufficient film thickness. Another disadvantage exhibited by the early neoprene coatings was the need for heat treatment to effect cure. While the uncured coatings were suitable for many applications the resistance of such films to degradation by weather, chemicals, etc., was lower than that obtained with cured films. These facts greatly limited the early attempts to use neoprene in protective coatings.

In view of the need for improved protective coatings, research was directed toward the development of a specialty type of neoprene which would meet these requirements. This work led to the development of KNR, a polymer which exhibited much greater solubility than the conventional neoprenes. KNR differs from the general purpose Type GN in that it can be plasticized to a much greater extent.

The effect of chemical peptization on the plasticity of Type KNR is shown by the data in Table I. In this experiment Thiuram E and Accelerator 552 were milled into the KNR on a cold mill. All batches including the control were milled for 5 minutes; the stocks were then "sheeted off" and plasticity pellets taken. Tests were run after 24 hours' storage at room temperature. It is evident that chemical plasticization effects a great reduction in the toughness of KNR, and as a result solvent solutions can be prepared from the polymer at relatively high solids concentrations.

Note: This article is based on a talk given by the author before the Elastomer and Plastics Group, Northeastern Section, American Chemical Society, Cambridge, Mass., February 14, 1952.

TABLE I—PLASTICIZATION OF NEOPRENE TYPE KNR

Composition	Williams Plasticity
Unmilled (Control)	168
Milled	120
1% Accelerator 552	30
2.5% Thiuram E	88
1% Accelerator 552 plus 2.5% Thiuram E	11

TABLE II—EFFECT OF LITHARGE ON WATER RESISTANCE

Litharge Concentration	Volume Increase (%) (8 Days in Water at 100° C.)
1	32.5
2	23.0
5	9.0
10	4.3

Development of Curing Systems

Shortly after the introduction of KNR, methods were developed which were capable of effecting complete cure at room temperature. These curing systems are based on combinations of litharge and Accelerator 833. The use of this combination of materials is advantageous for several reasons. For one, litharge improves the water resistance of neoprene compounds. This effect, to a certain extent, appears to be proportional to the litharge concentration, and is illustrated by the data in Table II. The substantial improvement effected by increasing litharge concentration is clearly evident.

Great flexibility in curing rate and "pot life" is a second advantage obtained with this curing system. It has been found that the litharge concentration exerts only a relatively small effect on cure rate, and the amount used can be that required to produce the desired water resistance or other characteristics, while the cure rate and pot life can be controlled by varying the 833 concentration. For example, with 1 or 2 parts of 833 relatively long pot life with corresponding slow cure will be obtained, while with 4 to 8 parts fast cure and short working life results.

Neoprene paints based upon these developments are finding extensive use as coatings for marine work and in chemical plants where extremely severe corrosive conditions are encountered. The excellent service provided by this type of protective coating is indicated by the results obtained in our own chemical plant. Two tanks which are located in an area involving constant exposure to acid fumes were selected for testing. One of these was coated with a conventional acid resisting alkyd paint and the other with a Neoprene Type KNR coating containing 100 parts of carbon black per 100 parts of neoprene and cured with litharge and Accelerator 833. The tank painted with the neoprene protective coating is still in excellent condition after sixteen months of service, whereas the control tank painted with

Table III—Crystallization Rate of Commercial Neoprenes

Neoprene Type	Crystallization Rate	Class
AC, GS	Fast—Hours	I
W, GN, GN-A, KNR	Medium—Weeks	II
RT, WRT	Slow—Months	III
FR, Q	Very Slow—Years	IV

the alkyd type finish required repainting in less than ten months.

Probably the major objection to neoprene paints has been the rubbery or stringy characteristics exhibited by these solutions. As a result of the stringy behavior these paints are more difficult to brush than conventional oil-based paints and are difficult to spray.

We have now found that these objections to the more widespread use of neoprene paints can be eliminated merely by increasing the concentration of filler included in the paint recipe. For example, a paint containing 250 parts MT black per 100 parts neoprene exhibits excellent brushing characteristics and can be sprayed. Additional advantages are obtained through the use of high pigment concentrations since higher total solids can be achieved at workable viscosities, and as a result extremely thick films can be deposited in a single application. Furthermore, much faster drying is obtained, and where a multiple coat system is required only an hour or two is required between coats. Much better chemical resistance is obtained with higher pigment loading, and uncured compositions may be suitable for many applications. Where cure is required the litharge-Accelerator 833 combinations discussed above are suitable. The working life of these mixes is much greater than that obtained with mixes containing lower concentrations of pigments.

With accelerated high carbon black mixes viscosity slowly increases, but excellent brushing is still obtained. For some purposes, it appears that this thickening may be advantageous since extremely thick coatings can be applied to a vertical surface without sagging. We believe that coatings of this type should find widespread use in applications where the outstanding protection afforded by neoprene is required.

Solutions of Neoprene Type KNR have also been used as putties and caulking compounds. The conventional method of making these putties has been to use a volatile solvent to obtain a suitable plasticity range. Such compositions have not found widespread use since shrinkage was always observed as the putties dried. Recently it has been shown that by replacing the volatile solvent with an oil, increasing the carbon black content of the mix, and incorporating an accelerator it is possible to produce putties which are not sticky to handle and which will set up without appreciable shrinkage. These compositions are very similar in handling characteristics to conventional drying oil whiting putties and should find use in many applications where outstanding resistance to chemicals is required.

To summarize the use of neoprene in protective coatings, a polymer is available in Type KNR, and techniques have been developed which enable the manufacturer to produce paints and putties with excellent handling characteristics and outstanding resistance to degradation, and it is believed that many new applications will be developed for these materials.

Phenomenon of Crystallization

Turning now to neoprene in adhesive cements, we find again that special characteristics are responsible for a major percentage of this use. The most important of these characteristics is the ability of a neoprene to crystallize rapidly at room temperature. This property of a neoprene permits the preparation of adhesives which develop strength rapidly and which possess high uncured strength. Since crystallization plays such an important part in neoprene cements this phenomenon will be discussed in some detail.

The molecules of an elastomer are generally considered to be in constant motion due to their thermal energy. During this motion several molecules may be thrown into positions where crystal structures can be formed. In some cases these crystal formations are sufficiently strong to overcome the thermal energy and in these cases the cohesive strength or toughness of the elastomer is greatly increased. In most cases, however, the crystal formations are not strong enough at room temperature to overcome the thermal forces and the crystal structures are not stable. As temperature is reduced, however, the thermal energy decreases and a point is reached where the crystal formations are strong enough to resist further movement.

Natural rubber, Butyl and neoprene are the only commercially available elastomers which exhibit crystallization. While each of these elastomers crystallize, the rate, extent and the effects of temperature vary widely. For example, natural rubber crystallizes at the maximum rate at —22°C. and neoprene polymers at 0°C. The higher crystallization temperature of neoprene was recognized as a disadvantage in dry compounding since pieces fabricated from neoprene slowly increase in hardness and stiffness on prolonged storage at normal temperatures. Extensive research has shown that crystallization rate can be controlled and it is possible to prepare both neoprene polymers which will crystallize in a few minutes at room temperature and others which crystallize at such a slow rate that the effect is for practical purposes eliminated.

Table III rates the available neoprene polymers with respect to crystallization rate. It can be seen from the table that classes can be established for crystallization

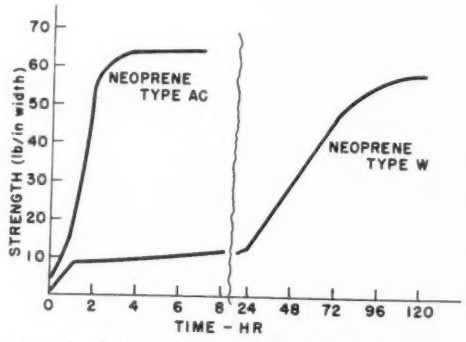

FIG. 1—Effect of crystallization rate on cohesive strength.

rate. AC and CG crystallize extremely rapidly and as a result are used widely in adhesive applications where fast bond strength development and high uncured strength are required. The second group containing Types W, GN, GN-A, and KNR crystallizes at a much slower rate. However, Type W crystallizes more rapidly than the others, and represents a material intermediate in rate between the fast AC and CG and the other members of Group II. Types RT and WRT represent another step and crystallize much more slowly than any of the polymers in Class II. The materials in both Classes II and III with the exception of Type KNR are general purpose neoprenes and represent the great bulk of neoprene consumption. The last group contains Types FR and Q which are special purpose polymers. Type FR was used where resistance to low temperature embrittlement was required, and Type Q is used for resistance to aromatic oils. Both of these can be considered non-crystallizable.

Most of the neoprenes are used to some extent in adhesives but Types AC and CG represent by far the most important class for this use, and the remainder of this discussion will be confined chiefly to these two types. As shown in Table III, AC and CG are similiar in crystallization rate. They are also similar in a number of other properties, and differ chiefly in stability, color and in behavior during breakdown. Stability is probably the major difference between the two, and it was the relatively poor stability exhibited by CG and CG cements which led to the development of Type AC.

Type CG when aged at room temperature slowly softens. The effect is greatest during the first month after manufacture during which time as much as a 50% change can occur. Following this initial rapid change, softening continues at a slower rate for approximately a year to eighteen months. The polymer then begins to toughen, and set up eventually occurs. Curing rate is also affected by storage and increases progressively. Type CG also breaks down rapidly during milling and this effect varies depending upon the age of the polymer.

With Type AC, on the other hand, very little change in plasticity or increase in cure rate is observed during prolonged storage at room temperature. As a result cements prepared from AC exhibit excellent storage stability with minimum change in viscosity or curing rate. Furthermore, AC does not break down during milling to as great an extent, and this behavior is not influenced by polymer age.

Cohesive strength is one of the most important properties of an adhesive film, and in many cases it is this property which determines the strength of the bonded unit. In addition to playing a major part in the ultimate bond strength, cohesive strength also influences the rate of bond strength development, wet strength, and strength at elevated temperatures.

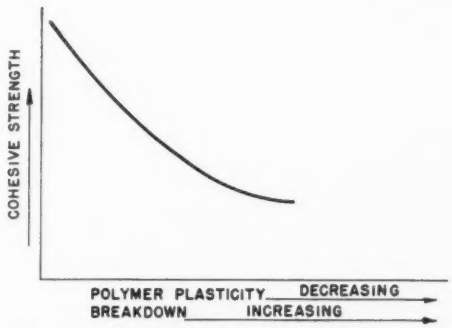

FIG. 2—Effect of polymer plasticity on cohesive strength.

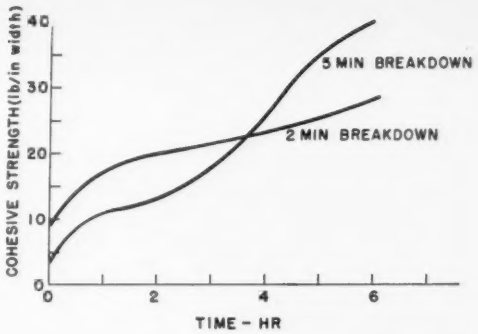

FIG. 3—Effect of breakdown on crystallization rate of Neoprene Type CG.

Effects of Crystallization Rate

As previously noted, crystallization and crystallizate rate play an important part in neoprene adhesives. This is due to the major effect which crystallization exerts on cohesive strength. While crystallization rate is one of the most important factors influencing cohesive strength, polymer plasticity, breakdown and compounding are also of considerable significance.

The effect of crystallization rate on the cohesive strength of neoprene cements is shown in Figure 1. In this experiment Type AC and Type W were used to illustrate the great effect of crystallization and the magnitude of the difference in crystallization rate between the fast AC and the medium Type W. Both polymers were broken down for 10 minutes on a cold laboratory mill and then dissolved in toluene to form gum cements having 20% total solids. Several coats were brushed on cotton duck allowing approximately one-half hour drying time between coats. The pieces were rolled together with a hand roller when the last coat was just tacky. The bonded strips were then conditioned for several days at room temperature to allow complete solvent evaporation. Following this treatment the strips were placed in a 70°C. oven for 5 minutes to remove crystallization. The strips were pulled on a Scott tensile tester immediately upon removal from the oven and at regular intervals thereafter.

These data clearly illustrate the great increase in cohesive strength caused by crystallization. With Type AC, crystal formation starts immediately upon removal from the oven and proceeds at a rapid rate until the film is completely crystallized in approximately 4 hours. With Type W, crystallization proceeds at a much slower rate and 120 hours or more are required to achieve maximum crystallinity. The initial jump shown by Type W is caused by the increase in strength as the temperature of the adhesive film drops to room temperature.

The effects of original or manufactured plasticity and mill breakdown on cohesive strength are shown in Figure 2. These effects are similiar and are shown by a single curve. Cohesive strength decreases as polymer plasticity is reduced. No figures are given in this graph

but the effect can be substantial. For example, with Type AC the cohesive strength of a gum cement was reduced from 23 lbs. per inch width to 13 lbs. per inch width by a 10 minute breakdown on a laboratory mill.

In addition to reducing cohesive strength, breakdown increases the crystallization rate of Neoprene Types CG and AC. This effect is illustrated by the data shown in Figure 3 obtained with Type CG. A smooth solution could not be prepared from the raw polymer and the data shown were obtained with samples which were milled for 2 and 5 minutes. These data were obtained by the technique discussed previously, that is, the canvas strips were coated and bonded and allowed to condition at room temperature. They were then heated to remove freeze and strip adhesion determined at room temperature.

The great increase in crystallization rate effected by mill breakdown is clearly evident. Additional breakdown (data not shown) does not result in any further increase in crystallization rate, but does cause further reduction in cohesive strength. The effect of breakdown on cohesive strength is also shown by these curves.

Cohesive strength is also effected by compounding as shown in Figure 4. In these curves calcium silicate concentration is plotted versus cohesive strength. The marked improvement effected by calcium silicate is clearly shown by the curve marked 4 minutes. These data were obtained using the same technique previously discussed and determining strength 4 minutes after removal from the 70°C. oven. The data shown in the curve marked 24 hours were obtained by repulling the same samples 24 hours later. In this case the adhesive films have crystallized and the effect of the calcium silicate is masked.

Other materials have been found which increase cohesive strength, but none, with the exception of colloidal silica, is as effective as calcium silicate. Many materials such as oils, waxes, plasticizers, and some resins decrease cohesive strength, and their use should be avoided when high wet or elevated temperature strength is required.

It will be noted that in all of this work the adhesion strips were heated to remove crystallization. This is necessary in any work designed to determine the effects of compounding, plasticity, etc., on cohesive strength, since the cohesive strength of frozen films is so high that the effects of these variables are completely masked. However, the effects of these variables on cohesive strength are important since when the cement film contains solvent or are at elevated temperatures crystallization forces are not effective, and the cohesive strength is determined by polymer plasticity, compounding, etc.

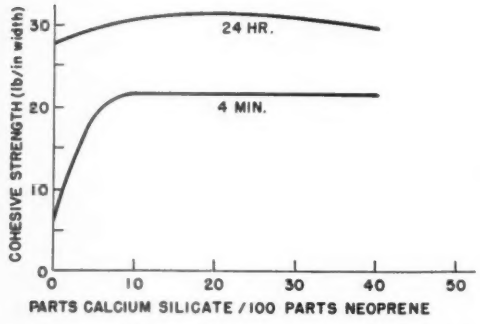

FIG. 4 — Effect of calcium silicate on cohesive strength of Neoprene Type CG.

TABLE IV—EFFECT OF CURE ON COHESIVE STRENGTH AT 60°C.

Cement	1	2	3	4	5	6
Type AC	100	100	100	—	—	—
Type W	—	—	—	100	100	100
Zinc Oxide	5	5	5	5	5	5
Magnesium Oxide	4	4	4	4	4	4
MDI-50	—	4	—	—	4	—
PbO	—	—	10	—	—	10
Accelerator 808	—	—	8	—	—	—
Trimene Base	—	—	—	—	—	4
Days	lbs./in. width					
1	3	9.5	6.5	1	19	—
2	2	12	8.5	1	19	1
3	3	12	—	—	—	—
4	—	—	10.5	—	—	7
7	2.5	13	—	1.5	20	15
14	3	15	—	1	20	—
20	—	—	—	1	21	—
37	5	16	—	—	—	—

Data on Cured Films

Up to now only uncured adhesive films have been considered. For many applications cured films are required and neoprene cements can be prepared which will cure upon the application of heat or at room temperature by the addition of suitable accelerators. Cure exerts a major effect on cohesive strength and the importance of crystallization, plasticity and other compounding ingredients is minimized in cured adhesives.

Room temperature cures can be effected with a number of accelerators and the data shown in Table IV illustrate the effect of curing on strength at 60°C. In this work MDI-50, a 50% solution of methylene bis (4-phenyl isocyanate) in ortho dichlorobenzene, is compared to the more conventional systems based on litharge and Accelerator 808 or Trimene Base. It is evident that a faster cure is obtained with MDI-50 than with the other systems. This is particularly evident with Type W where the stock containing MDI-50 is completely cured after only 1 day at room temperature while the cement cured with litharge and Trimene Base has not reached the maximum after 7 days. This is interesting since the "pot life" of the MDI-50 cements is about equal to that obtained with the other agents.

It can be seen that with either curing system a substantial improvement in hot strength is effected. Room temperature accelerators usually must be added to a cement just before application since the accelerated mixes thicken and cannot be used for extended periods. This limited "pot life" is an obstacle to the more widespread use of room temperature curing cements, but to date no materials have been found which will effect cure without reducing "pot life". However, MDI-50 may represent a step in the right direction.

Neoprene has come a long way since its introduction 20 years ago. Progressing from the single polymer originally available we now have neoprenes with extremely high solubility, and others which are essentially insoluble; neoprenes which resist crystallization, and others which crystallize at extremely rapid rates. The improvements which have been achieved have resulted from a combination of basic research directed towards the development of new polymers and industrial application work.

The Effective Equivalent Weights of Some Rosin Acids and Soaps

By S. H. MARON, B. MADOW, and E. BORNEMAN

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A number of commercial resins and dresinates have been analyzed by conductometric titration for soap and rosin acid, as well as moisture contents. The acids included were Resin 731 and K-wood rosin, while the soaps were Dresinates 731, 214, 87, 89, and 90. From the data obtained were calculated the effective equivalent weights of the acids and soaps involved.

IN ORDER to express on a percentage basis the soap and acid contents of synthetic latices prepared with various rosin soaps, the equivalent weights of the latter are required. This paper presents analytical data from which the effective equivalent weights of a number of such substances can be calculated.

Commercial rosin soaps and acids contain, besides the active ingredients, non-saponifiable or neutral matter. During the titration of these with acid or base the soap and free acid contents can be determined, but the neutral matter cannot. Hence, in evaluating effective equivalent weights we may resort to the calculation of the equivalent weight of the ingredients on the basis of the total dry weight of material present, and this is the procedure followed here.

The results presented below cover the analysis of the following Hercules Powder Company products: Dresinates 731, 214, 90, 89, and 87; and K-wood rosin and Resin 731. Also included are results obtained for the analysis of a sample of purified dehydroabietic acid furnished us through the courtesy of Dr. D. A. Shepherd of the University of Illinois.

Experimental Procedures

For determination of the solids contents of the dresinates and acids, three samples of each material were weighed into aluminum pans and placed in a vacuum oven kept at 50° C. During the drying period, lasting 36 hours, the samples were removed periodically, cooled in a desiccator, and weighed. The minimum weight obtained, expressed as a percentage of the original weight of the sample, was taken to be the solids content of the substance.

To determine the soap and acid contents of the dresinates and rosins, duplicate samples of about three grams each were dissolved in 99% isopropyl alcohol, and transferred to 250 ml volumetric flasks kept at a constant temperature of 30° C. Dilution to the mark was made with thermostated isopropyl alcohol and water in quantity to yield a final 50:50 mixture by volume of the two solvents. Twenty-five ml aliquots were then transferred from the flasks at bath temperature into 400-ml beakers, 250 ml of 50% isopropyl alcohol-water mixture added, and the samples were titrated conductometrically with 0.1N HCl to obtain the soap content *(1)*. For rosin acid content determinations, 50 ml aliquots of the dresinates and 25 ml aliquots of the resins were used. The titrations were again made conductometrically in the same solvent mixture with 0.1N NaOH *(1)*.

Sharp breaks were obtained in the conductance titration plots of all the rosin soaps and acids. Since free rosin acid was found in every dresinate analyzed, there was no excess alkali present in any of the samples to complicate rosin soap determination. All base-consuming material present was taken to be rosin acid.

Purified dehydroabietic acid was assayed conductometrically by titrating 0.2, 0.3, 0.4, and 0.6 gram samples in 50% isopropyl alcohol with 0.1N NaOH. These samples were then back titrated with 0.1N HCl in order to determine the excess base added and the sodium dehydroabietate formed, the back titration giving thus a check on the analysis *(1)*.

Acid and base blanks were determined on the 50% isopropyl alcohol employed for all the conductance titrations involved. Samples of 250 ml of solvent mixture were found to consume 0.017 milliequivalents of NaOH in base titrations, whereas in acid titrations, using alcohol to which free base had been previously added, an HCl consumption of 0.029 milliequivalents was found. No acid blank was observed for 50% isopropyl alcohol having no added base. The above blank corrections were applied wherever called for to all the titrations reported here *(1)*.

TABLE I—EFFECTIVE EQUIVALENT WEIGHTS OF ROSIN SOAPS AND ACIDS

Material	Resin	Alkali	Solids Content (%)	Meq./Gram—Dry Basis— Acid	Soap	Equivalent Wt— Acid	Soap
Dehydroabietic acid	——	——	100.00	3.350	——	298.5	——
K-wood Rosin	K-wood Rosin	——	99.24	2.962	——	338	——
Resin 731	Resin 731	——	99.48	2.929	——	341	——
Dresinate 731	Resin 731	NaOH	66.74	0.384	2.414	338	360
Dresinate 214	Resin 731	KOH	67.58	0.423	2.294	336	374
Dresinate 87	Pexite 42	NaOH	88.86	0.299	1.552	522	544
Dresinate 90	Pexite 42	KOH	89.33	0.330	1.527	507	545
Dresinate 89	Gum 42	KOH	91.51	0.298	1.513	520	558

Results and Discussion

In Table I is given a summary of all the results obtained in this study. Columns 1-3 list respectively the designation of the sample, the resin involved, and the base with which the resin was neutralized in the case of the dresinates. The next three columns give, in turn, the solids contents of the samples, and the milliequivalents of acid and soap per gram of dry sample found in these. In the case of the acids the effective equivalent weight of the acid, A, follows immediately as

$$\frac{1000}{x},$$

where x is the milliequivalents of acid found per gram of dry weight of acid. On the other hand, in the case of the dresinates, where both soap and acid are present, we proceed as follows: The weight of acid in a gram of sample is given by

$$\frac{xA}{1000}.$$

Again, the weight of soap in a gram of dresinate must be

$$\frac{yS}{1000},$$

where y is the milliequivalents of soap found per gram and S is the equivalent weight of the soap. Consequently

$$\frac{xA}{1000} + \frac{yS}{1000} = 1 \qquad (1)$$

However, $S = (A - 1) + C$, where C is the atomic weight of the cation present in the soap. Substituting this value of S into (1) we get

$$xA + y\,(A - 1 + C) = 1000$$

and

$$A = \frac{1000 - y\,(C - 1)}{x + y} \qquad (2)$$

The values of the effective equivalent weights of the acids and soaps thus obtained are listed in the last two columns of the table.

The equivalent weight for the dehydroabietic acid found here is 298.5. This value is in quite good agreement with the theoretical 300.4, and is in still better agreement with the value of 299.4 obtained for the same sample through the use of indicators by Laitinen and Jennings *(2)*.

The results given in Table I show that the equivalent weights of Resin 731 are essentially identical whether obtained from the acid or the two dresinates containing it. Further, the average found for Resin 731 is identical with that obtained for K-wood rosin. On the other hand, these equivalent weights are in all cases much lower than those obtained for Pexite 42 and Gum 42, which, although practically identical, are nevertheless about 180 units higher than those for K-wood rosin and Resin 731.

This difference in the equivalent weights of the two sets of rosin acids is directly connected with the neutral body contents of these acids. According to available information the percentage of neutral bodies in Resin 731 is about 14%, whereas that in Pexite 42 and Gum 42 is about 40%. In view of the fact that the neutral bodies are included in the calculation of the equivalent weights of the acids, the equivalent weights of Pexite 42 and Gum 42 should come out to be much higher than those of K-wood rosin and Resin 731, as is actually the case.

It may also be seen from Table I that whereas the rosin acids contain generally less than 1% of water, the moisture contents of the dresinates are quite high. In some cases, such as Dresinates 731 and 214, the water present may amount to as much as one-third of the total weight of the material.

ACKNOWLEDGMENT

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Letter to the Editor

Dear Sir:

Little did I realize when I wrote the short note in the *India-Rubber Journal* of May 19, 1951 (GR-S X—Is It a Development of the "Oil Technique"?), that it would bring forth such an excellent review as that written by Fritz Rostler (in the August, 1951, issue of RUBBER AGE). Many people seem to have confused the two methods: (1) swelling of GR-S in oil, and (2) mixing oil in GR-S, the first of which in my experiments at I.C.I. gave much superior results.

The earliest reference given by Rostler was British Patent 250,279 (1925), but I can say that the soaking (or swelling) of Para rubber in oil was practiced certainly before 1914. It was, to my knowledge, done for two reasons: (1) To prevent the breakage of mill frames, many of which were of cast iron in those days, and (2) To reduce the amount of solvent required in "spreading" compounds while retaining a greater percentage of the Para rubber's original strength. In the "oil technique" I claimed no invention, but it was a discovery leading to easier processing and I might say based on my experience with Para many years ago.

One of your British contemporaries made some distorted and sarcastic comments to the effect that I was ignoring the achievements of American chemists and technologists, for whom I have the highest esteem. I did, however, suggest that if this "swelling" technique was known by our American friends during the war that was the time to use it when both natural rubber and GR-S were in short supply. I also inferred that the publication of the GR-S oil technique pamphlet after the war may have aroused further practical interest in the "oil swelling" technique as applied to synthetics and if that was the case all credit should be given to our friends the American chemists and technologists for its further development.

In my note I simply asked: "Is it a development of the GR-S oil technique?", and no one can answer that question more truthfully than those engaged in the production of GR-S-X since the end of the war.

H. C. HARRISON, F.I.R.I.

Maidenhead, England
Sept. 28, 1951

Securing Tension Control and Safety in Tire Fabric Units

By J. R. WICKEY

Electrical Engineer, Clark Controller Co., Cleveland 10, Ohio

A VERY interesting installation of "3C" Electrical Control Apparatus (made by the Clark Controller Company) was made in Plant 2 of the Mansfield Tire & Rubber Co. at Mansfield, Ohio, a few years ago. The company's tire brands—Mansfield, Century, United and Richland—for car, bus and truck are widely known and enjoy an enviable reputation.

Several definite problems had to be solved, chief among these being uniform thickness of rubber coating on the tire fabric, speed of operation, and proper centering and tension on the fabric at all stages of the process. Too light a coating on the fabric results in weakness of the completed tire; too heavy a coating wastes rubber, besides adding unnecessary weight to the tire. Speedy operation is necessary in order to keep up with production schedules; proper centering must be maintained so that the fabric entering the calender will stay in proper relation to the rubber in the calender rolls, and proper tension is essential to prevent the fabric from creasing or folding in its rapid trip through the calender, and its various auxiliaries.

Another feature, equally important, was to provide operator safety. This was obtained by housing the main control panels, all of which are enclosed in dead front steel cabinets, in a separate control room; provision for padlocking the doors of these cabinets is made to prevent tampering by unauthorized persons; the three individual operator's panels are dead front construction, and each panel permits instant stoppage of the line. The calender and mills are each equipped with "3C" rubber calender safety switches; the main operator's bench board is set upon a raised platform, from which the operator can see the entire line, and can stop the entire line at a finger touch.

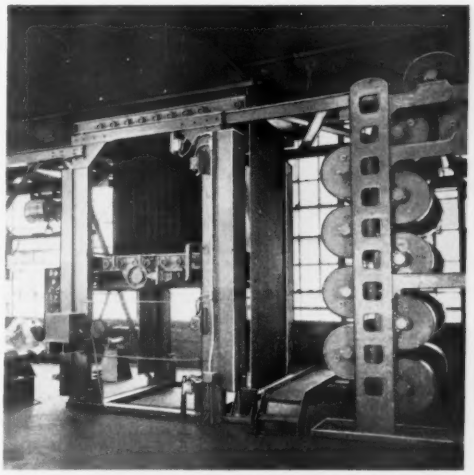


FIG. 2—Let-off festoon (left) and dryer (right).

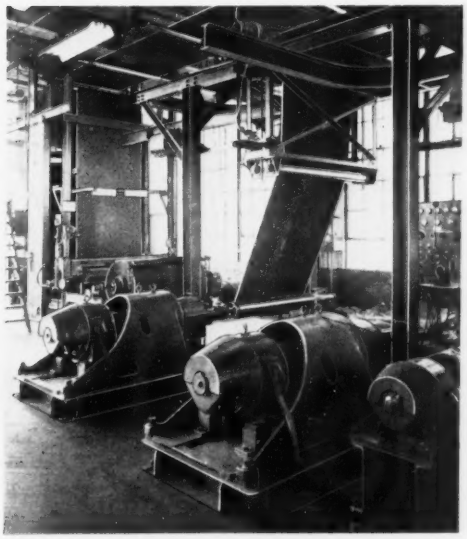


FIG. 1—Pre-dip festoon and wind-up (left), let-off section (center), and let-off operator's panel (right).

Still another problem is to permit continuous operation from the pre-dip unit on the floor above the calender unit to the end of the line, and also to permit semi-continuous operation if for any reason it is necessary to wind the fabric onto "shells" or rolls, after the fabric has passed through the pre-dip unit.

All of these problems have been successfully solved, and the line operates at speeds varying from 6 to 60 yards per minute—the slower speeds being necessary when threading the "shells" or rolls into the line.

On the floor above this main calender line, the fabric, either cotton or rayon, 60 inches wide, is pre-dipped and fed through the ceiling of the main calender room into a pre-dip festoon shown at the extreme left of Figure 1. As there are other festoons in the line, an explanation of their operation may be in order.

The festoons consist of a number of rotating stationary rolls at the top of a steel frame over which the fabric passes. Below, but sliding up and down in the frame, are other rolls. The fabric is looped over the top rolls

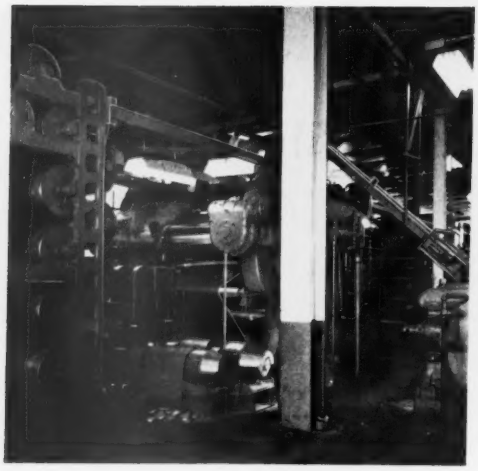


FIG. 3—Delivery end of the dryer and pre-tension apparatus (left), centering device (left of center), and entry side of calender (right of center).

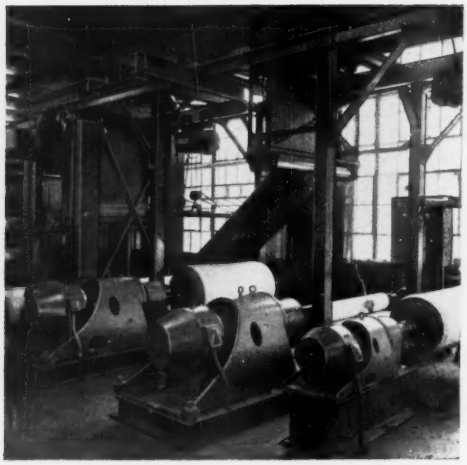


FIG. 5—Wind-up festoon (left), wind-up section (center), and wind-up operator's panel (right).

and under the lower rolls, creating a series of fabric loops or festoons.

As tension must be maintained in other parts of the line, these festoons act as reservoirs, or stockpiles of fabric, so that no matter how great the pull on the fabric in other parts of the line, there is always a surplus of material available. Conversely, if there is a shutdown or stoppage in other parts of the line, the festoons take up the excess fabric not being used. To prevent all the surplus from being drawn out of the festoons, a "3C" track type limit switch slows the calender; above it is a Hatchway limit switch which stops the calender when the lower rolls of the festoon reach the empty position. A similar set of limit switches prevent the festoon from becoming too loaded. The festoons ahead of the calender operate as above; following the calender, the operation is exactly the opposite. These switches are shown on the right hand column of the festoon in Figure 2.

Returning to the operation of the main line, if it is desired to wind the fabric into "shells," it is fed to the pre-dip wind-up, as shown in the center of Figure 1. Just to the right of it, an almost empty "shell" is being fed into the No. 1 fabric let-off. These "shells" are removed from the pre-dip wind-up and stored for future use.

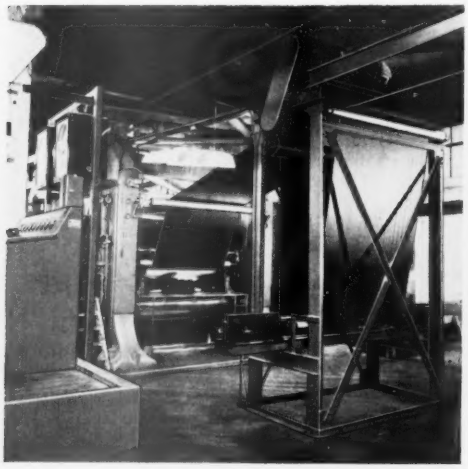


FIG. 4—Calender operator's bench board (left), delivery side of calender (center), and post tension unit (right).

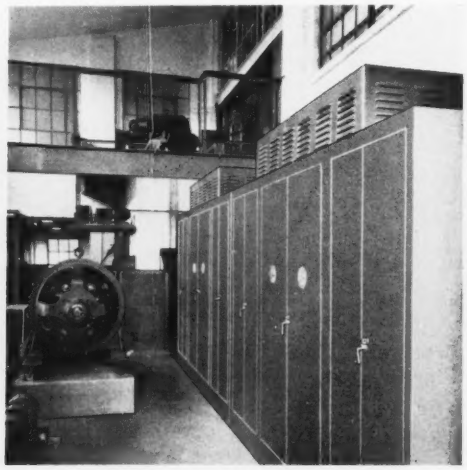


FIG. 6—Partial view of the control room showing dead front cabinets and the large 200 kw. motor generator.

When the continuous process is operating, the fabric passes directly from the festoon to the let-off clamp, then into the let-off festoon, thence into the dryer—both festoon and dryer being shown in Figure 2. At the right rear of Figure 1 and left rear of Figure 2 is shown the let-off section operator's panel which gives the operator complete control over that section, and also permits instant stoppage of the entire line, if necessary.

A typical operator's panel has five pilot lights marked "Calender Section Run," "Let-Off Section Ready," "Calender Section Ready," "Wind-up Section Ready," and "Emergency Stop Circuit Closed." Push buttons and master switches give the operator individual control of all operations in his section of the line.

Figure 3 shows at extreme left the delivery end of the dryer. Adjacent to it is the pre-tension apparatus and the centering device. The fabric is threaded through these and into the four-roll calender. Not shown in the photo, except as a blurred streak above the calender rolls, is a moving arm which is fed with rubber by a conveying belt shown running upward at about a 45° angle. The end of the mill which feeds rubber to this belt is shown at the extreme right, and the mill is also equipped with "3C" rubber mill safety switches, insuring instant stoppage in emergencies. The moving arm spreads a continuous strip of rubber back and forth across the top calender rolls, thus insuring a constant supply so that uniform coating of the fabric is obtained.

At the extreme left of Figure 4 is shown the master operator's bench board, set on a raised platform. In the center background is the delivery end of the four-roll calender, also equipped with rubber mill safety switches. Feeding into the lower rolls is rubber for coating the underside of the fabric, and this rubber is fed from the same mill shown in Figure 3. The fabric then threads through the post tension rolls.

At the extreme left of Figure 5 is shown a small portion of the cooling drums through which the fabric passes before entering the wind-up festoon immediately in front of the cooling drums. Hatchway and track type limit switches, functioning as described on other festoons, are also operative here.

Passing through the wind-up festoon, the fabric is sent through the wind-up section to be wound into "shells." The fabric is sticky or "tacky," and to prevent it from adhering to itself it must be wound with a liner. In this operation, utmost care and synchronization is necessary, to insure that neither fabric nor liner develop buckles, wrinkles, creases or pleats, and that the "shells" are well centered. The operator's wind-up panel is shown at the extreme right in Figure 5. For ease in starting the fabric and liner on the "shells," two foot switches are used. One switch actuates the "Forward" motion, and the other the "Reverse" motion. As these switches have no latching devices for maintained contact, a tapping motion of the operator's foot allows "inching" of both fabric and liner until the "shell" is on its way to winding both under correct tension.

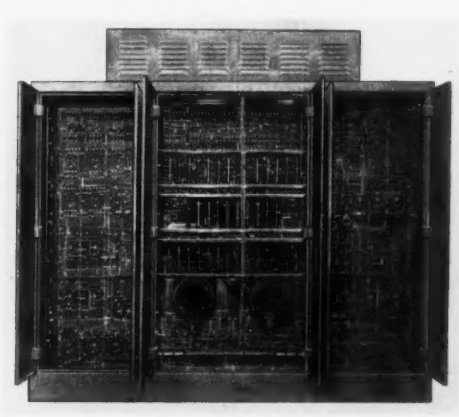


FIG. 7—Front view of the let-off section.

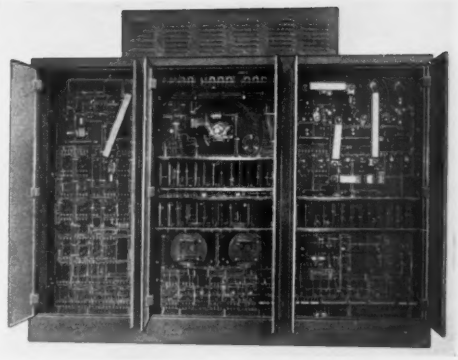


FIG. 8—Rear view of the calender section indicating the intricate wiring necessary.

Figure 6 shows a view of one part of the control room. To the right are the dead front "3C" control cabinets with ventilated resistor units mounted on top. A 200 KW motor generator set for the calender section is shown at the left; under the balcony are two motor-operated rheostats which bring the let-off and wind-up sections into synchronism with the calender section when either of these sections has been stopped for changing "shells." On the balcony is the 250 H.P. motor driving the calender.

Some idea of the complicated control necessary for this line may be gained from the following: 16 motors ranging from 1½ H.P. to 250 H.P., 3 generators 10 kw. to 200 kw., and 13 booster generators ¾ to 2 kw. provide the power to operate the entire line.

A front view of the let-off section indicating the neat orderly arrangement of the apparatus is shown in Figure 7. Similar workmanlike panels are also operative for the calender section and the wind-up section.

Figure 8 indicates the intricate wiring necessary for successful operation of the control apparatus. It is estimated that approximately 15 miles of wire were needed for the wiring on the rear of these 3 panels.

All control is heavy-duty mill type to deliver satisfactory service under gruelling operation. Although these control panels are designed for a very special job, they are made up of standard Clark "3C" apparatus such as Vari-Time and R. D. contactors, control relays of several types, overload relays, and other standard Clark apparatus.

The industrial swing to variable voltage to provide a very wide motor speed range, more flexible speed control, and to secure tension control, plus the modern trend to concentrate all control devices, including meters, resistors, switches, gauges, etc., in factory assembled and wired panels all housed in dead front matching cabinets, has resulted in such installations as this at the Mansfield plant.

Editorials . . . . . .

Extended Legislation

A FEW months ago we predicted in these columns that Congress would extend the Rubber Act of 1948 without any substantial change, despite the recent recommendation of President Truman with regard to disposal of the Butyl rubber facilities to private industry. As reported elsewhere in this issue, the House has already approved legislation extending the Act for another two years *without change* and the Senate is expected to approve the House measure within the next few weeks. The new legislation would make the law effective until June 30, 1954.

The House measure was prepared by Rep. Carl Vinson (Dem., Ga.) and approved by the House Armed Services Committee, of which Mr. Vinson is chairman. It is important to note that the House Committee acted on the bill without public hearings of any kind. The Committee, and particularly Mr. Vinson, is convinced that industry has already presented every possible argument with respect to any desired changes in current rubber legislation, especially with regard to disposal of the synthetic rubber production facilities. Further, Mr. Vinson is on record against any changes in the law as long as national security is endangered.

For the record, it will be recalled that the original Rubber Act of 1948 authorizes government ownership, maintenance and operation of the war-born synthetic rubber industry, with plants valued at over $700,000,000 and capable of producing over 1,000,000 tons of synthetic rubber annually. It also authorizes government controls covering mandatory consumption of at least 200,000 tons of GR-S and 22,500 tons of Butyl rubber per year. Mandatory consumption is assured through specification controls over end-products. Actually, production of GR-S is approaching a rate of 750,000 long tons a year, while Butyl rubber has reached a 90,000-ton-a-year figure.

Although Mr. Vinson is obviously completely convinced that the synthetic rubber industry should remain entirely in government hands until all danger to national security is eliminated, he seems equally convinced that the government should withdraw from this position at the earliest possible moment. This position is not as paradoxical as it sounds, since Mr. Vinson's legislative record indicates that at all times he has been opposed to government controls for the sake of control. Few legislators understand military necessities as does the representative from Georgia.

An indication of Mr. Vinson's thinking in this respect can be gleaned from a special recommendation made by the House Armed Services Committee in passing the extension legislation to the full House. Stating that government specification, allocation and inventory controls have been "effectively and fairly administered," the Committee suggested that the government should revise its pricing system for synthetic rubber "so that the price would reflect more closely the selling price that private enterprise would expect if private industry were operating the plants."

In this connection, the Committee noted that the present selling price of synthetic rubber established by the government omits certain sales expenses and makes no provision for income taxes. It suggested that a better basis for eventual disposal of the government's synthetic rubber facilities would be provided if the price charged by the government was revised to more closely coincide with that private industry might have to charge if it were operating the plants. It also suggested that the Reconstruction Finance Corporation, which produces and sells GR-S, analyze the probable costs of operation to a private operator. RFC recently reported a profit of $11,000,000 on its synthetic rubber operations for the last fiscal year. If selling costs and income taxes were deducted, this figure would be appreciably reduced, if not eliminated.

During the House debate on the bill to extend the Rubber Act, Rep. William H. Ayres (Rep., Ohio) made a few pertinent remarks with regard to the disposal question. Pointing out that under present legislation a disposal plan was to have been submitted to Congress by January 15, 1952, Mr. Ayres wanted to know if there was one submitted, whether public hearings on it were held, what viewpoint did the Administration express, and what were the specific views of the potential buyers.

The questions were academic, since Mr. Ayres knew the answers, but his point was that since no definite disposal plan has been prepared in the past four years, there was little reason to expect that one would be advanced in the next two years, unless the extended legislation carries a firm and clear directive to the Administration to carry out the intent of Congress within the period provided by the deadline. Actually, Mr. Ayres favored a one year rather than a two year extension.

Despite Mr. Ayres' impassioned plea, and despite the knowledge that RFC is currently preparing a realistic disposal blueprint for the synthetic rubber facilities, we still maintain that a status quo will continue for another two years, and beyond that time if world conditions remain in their present unhappy state.

NEWS OF THE MONTH

HOUSE VOTES TWO-YEAR RUBBER ACT EXTENSION AS NPA EASES CURBS ON NATURAL RUBBER USE

ON MARCH 26, the House of Representatives of the U. S. Congress passed and sent to the Senate a bill extending government rubber controls for another two years. On the same day, the National Production Authority, in an amendment to its Order M-2, eased restrictions on the consumption of natural rubber. The House action gives the government continued authority to operate synthetic rubber plants and stipulates minimum amounts of synthetic rubber which must be consumed in the United States each year. The present law expires on June 30, while the bill passed by the House would make the law effective until June 30, 1954. The Act also contains authority for allocation and inventory controls and import controls on natural rubber. President Truman, in his message to Congress in January on the Rubber Act, had suggested that the Administration be empowered to sell its two Butyl rubber plants to private industry. The House Armed Services Committee decided against this, however, and no such provision was in the bill approved and sent to the Senate.

NPA Order M-2, as amended March 26, increases the amounts of natural rubber which may be used in the manufacture of automotive tires. It also lifted restrictions on the manufacture of white sidewall tires. E. D. Kelly, Director of the NPA Rubber Division, said that the changes in the order represent a lessening of controls and is consistent with the agency's over-all policy to relax controls as quickly as possible whenever such action does not substantially hinder the defense program. Mr. Kelly said that further relaxations on the consumption of natural rubber will be made in the near future. These prospective changes will serve to widen the area of competition between natural and synthetic rubbers.

Follows Previous Relaxation

The March 26 action follows a previous relaxation of restrictions on the use of natural rubber initiated by the Defense Materials Operating Committee and Manly Fleischmann, Defense Production Administrator, on February 23. At that time restrictions on the importation of dry natural rubber were lifted and the General Services Administration was permitted to relinquish its position as exclusive importer of dry natural rubber as of July 1, 1952. In addition, the permitted amount of dry natural rubber which industry may use in a calendar quarter was raised from 105,000 to 110,000 long tons for the second, third and fourth quarters of 1952. The most recent revision of Order M-2 provides for the following:

(1) Permits the private importation of dry natural rubber without license by the GSA Administrator after July 1, 1952.

(2) Continues the prohibition of the private importation of natural rubber latex (except by permission of the GSA Administrator) until such time as the government-owned stock of natural rubber latex has been disposed of and at which time the order will be further amended.

(3) Eliminates the requirement to furnish the GSA Administrator with a certificate with respect to inventories of dry natural rubber.

(4) Raises the percentage of all dry GR-S which may be purchased from the Reconstruction Finance Corporation in the form of "cold rubber" from 46 to 50%.

(5) Transfers "valves" from the non-transportation to the transportation category, thereby making it possible for valve manufacturers to use the larger proportion of Butyl rubber permitted in the manufacture of transportation items.

Larger amounts of natural rubber are permitted in the manufacture of tires through changes made in Appendix A specifications with percentages being increased as follows: bicycle tires, from 13 to 17; motorcycle tires, from 14 to 17; passenger car tires in sizes through 7.10 and 6.50, from 14 to 17; passenger tires in sizes over 7.10 and 6.50, from 20 to 25; industrial pneumatic tires, from 13 to 17, and tractor implement tires, from 13 to 15.

Other changes in Appendix A specifications include:

(1) The addition of new products for which percentages of natural rubber may be used in their manufacture. The products are molded stoppers for food and beverage containers, moisture barrier coating for film or paper, core molded electric plugs and outlets, sponge rubber-cork granules, and molded sole edging.

(2) Increases in the percentages of natural rubber which may be used in the manufacture of gaskets, agitators, and soling and toplifting.

(3) Decreases in the percentages of natural rubber which may be used in the manufacture of tubing and water aerators.

Private importation of both dry natural rubber and natural rubber latex was prohibited by NPA on December 29, 1950, when GSA was given exclusive authority to import these materials to safeguard the supply and assure the most advantageous use of natural rubber in the interest of national defense.

On the same day that NPA announced its revision of Order M-2, its Rubber Industry Advisory Committee recommended the revocation of the order by July 1. The committee recommended that controls be limited to the R-1 type of order in effect prior to the Korean hostilities. That order, issued under the Rubber Act of 1948, set a minimum required consumption of synthetic rubber at a level of 200,000 tons annually.

Several industry spokesmen questioned the advisability of designating a tonnage figure at this time. One spokesman stated that the minimum level should be any figure consistent with national security requirements.

In explaining the relaxation of rubber restrictions in Order M-1, NPA emphasized that although the prohibition on the manufacture of white sidewall tires had been lifted, no pale crepe rubber can be used in the manufacture of such tires. NPA defined pale crepe as grades "1-X-1, -2, or -3, thick or thin pale latex crepes".

Price Reductions Announced

GSA announced on March 15 that natural rubber imported by the government for resale to industry will be priced at 48½c a pound on all sales made during April and May. This is a cut from the previous price of 50½c established on January 17. Jess Larson, GSA Administrator, said the price drop again demonstrates the desire of the government to pass along to industry the savings which accrue when there is a drop in the price for natural rubber on the world market.

GSA first established the resale price of natural rubber at 66c in January, 1951. When its purchase activity had been instrumental in lowering the then world price of nearly 80c a pound to more reasonable levels, the resale price was cut to 52c in June of 1951, with the other reductions coming in 1952.

(EDITOR'S NOTE: It has since been learned that GSA is considering a gradu-

ated method of reducing its price for natural rubber during the next three months, rather than retaining the 48½c a pound price for April and May. This method is being considered as an alternate to avoid reducing the price sharply on June 1 to more nearly equal current market conditions.)

On March 7, Harry A. McDonald, RFC Administrator, announced that his agency's selling price for GR-S had been reduced from 26 to 23c a pound as of March 8. The price decrease of 3c a pound is a result of the current RFC program to expand the output of synthetic rubber from 760,000 long tons a year to 860,000 tons, and a decrease in the required use of high-cost alcohol-butadiene.

Last September, RFC raised the price of net GR-S from 24½c per pound to 26c per pound. The increase was to assure a break-even operation on the basis of an annual production rate of 860,000 long tons of GR-S by June of this year, of which about 31% was to have been produced from alcohol-butadiene.

RFC has also announced a reduction in prices on its unrefined GR-S residue, as follows:

Approximate Moisture Content	*Price Per Pound (c)*
5%	11.09
10%	10.48
15%	9.87
20%	9.26
25%	8.65
30%	8.04
35%	7.43

The prevailing uniform freight charges (not included in the aforementioned prices) are applicable to the gross shipping weight of the various above described materials.

On March 12, the Office of Price Stabilization provided a formula for determining ceiling prices for export sales of GR-S, effective March 17. The action followed a recently announced government program for exporting 17,000 tons of GR-S for the first quarter of 1952. Domestic ceilings are f.o.b. point of production. To these ceilings may be applied export mark-ups of 3% for sales in carload lots and 3½% for sales in less than carload lots. These export mark-ups may be applied only to costs of acquisition at point of production.

Additional Costs Allowed

The new OPS regulation, SR-2 to CPR 61, also permits addition to the export ceiling price of actual delivery costs and costs of exportation. As determined by the RFC, the permissible delivery charges are $1 per hundredweight in carload lots (60,000 pounds) and $1.60 per hundredweight for less than carload shipments. Costs of exportation, as defined in Section 3 of the export regulation, include actual costs of packaging, ocean freight and insurance and lighterage.

RFC is also giving consideration to the possibility of shipping quantities of GR-S on a consignment basis for storage in consumer's plants. This would accomplish two results; namely, it would allow for quick delivery to consumers during those periods when it is possible to make shipments on short notice directly from production lines, and it would avoid the necessity of shipping into public warehouses and then withdrawing the rubber within a matter of a few days or weeks.

RFC stated that it will not pay storage, handling or any other charges which may be incurred by the consumer in connection with this plan. Other details regarding conditions of storage, etc., will be worked out at some future date, the government agency said.

19,000-Mile Tires for U.S.

Spokesmen for the General Services Administration, in a recent appearance before a House appropriations subcommittee, stated that the government from now on will require a manufacturer to guarantee at least 19,000 miles on tires sold to the government. The 19,000 mile minimum was set on the basis of special tests carried on by the government for several years. GSA buys $20,000,000 worth of first-line tire annually for use by the civilian agencies of the government. The tire making industry has been kept up to date on developments and has agreed to go along with the new program which should result in tax savings, GSA said.

House Group Urges Increase

The government's action in reducing the price of synthetic rubber prompted a statement by the House Armed Services Committee calling for an increase in the price of synthetic rubber. The committee said that the current price for synthetic rubber should reflect more accurately what industry will charge when it takes over synthetic production. The committee recommendation was filed in the House along with the bill to extend government controls for another two years. This report also disclosed that natural rubber stockpiling goals have not been met entirely.

The report also cited reasons for the group's decision to keep the synthetic program a single unit, rather than sell the Butyl units to private industry as the President had recommended. The committee was of the opinion that the entire synthetic rubber program should be treated as an integral part of the defense program.

The committee also warned that the pricing system now in effect may adversely affect the eventual disposal price received by the government when the synthetic facilities are sold by the government to private industry. When and if private industry gets into the field of making synthetic on a large scale, the report said, the price of the product will have to rise.

Meanwhile, the Senate Small Business Subcommittee has resumed hearings, this time to review developments in the rubber industry. The hearings were held on March 26 and 27 with appearances by Jess Larson, Leland E. Spencer, RFC Rubber Director, and Donald F. Pratt, vice-president of the Durkee-Atwood Co.

Mr. Pratt said that lots of synthetic production meant protection for the small concern that finds itself short of natural rubber at times. Mr. Larson urged retention of such controls as will require sufficient use of synthetic rubber to keep the industry going. Mr. Spencer stated that he believed the required use of synthetic should not drop below the point where it will be necessary to close any of the government-owned plants making the product out of petroleum. Mr. Spencer, however, differed with Mr. Larson on the point that synthetic has "practically" replaced natural. Some qualities in natural rubber cannot be matched by synthetic and are needed in certain products, Mr. Spencer declared.

Synthetic Rubber News

John L. Collyer, president of the B. F. Goodrich Co., recently stated that the country's over-all facilities for the production of synthetic rubber are currently operating at a rate of 930,000 long tons a year and will provide about 65% of the new rubber to be used in the United States during 1952. He estimated that the nation would use between 1,200,000 and 1,300,000 long tons of new rubber in 1952 as compared with 1,214,000 long tons in 1951.

Mr. Collyer declared that we have enough rubber, both natural and synthetic, to meet all essential needs for a five-year all-out war, should such a disaster occur. He also said that American tire manufacturers should be in a position to produce at least 72,000,000 passenger car tires during 1952, about 6,000,000 more then were manufactured last year.

B. F. Goodrich Chemical Co., subsidiary of the B. F. Goodrich Co., has announced a 30% increase in the output of "cold rubber" at the government-owned plant at Port Neches, Texas, which it operates. The increase in production was made possible by a major improvement in the manufacturing process, company officials said.

Increases Reaction Rates 30%

It was explained that the new process, using existing plant facilities, increases reaction rates 30% or more. Over-all cost of the rubber is lowered by a reduction in the amount of auxiliary chemicals used to promote the rubber-forming chemical reaction. The cold rubber so produced is appreciably more uniform in quality, and the process requires less exacting technical control.

Now in full-scale production at the Port Neches plant, the process uses a tetra-sodium salt of ethylene diamine tetra-acetate, which forms complex compounds with the iron, calcium, and magnesium ordinarily found in water. This chemical is added to the water used in making cold GR-S latex. Time required for the rubber making reaction is decreased by 3 to 4 hours, the company

said, which results in more cold rubber produced in each polymerizer during a given period. By using the water-treating chemical, it was said, smaller amounts of catalysts are necessary.

The government-owned synthetic rubber plant operated by the Firestone Tire & Rubber Co. at Lake Charles, La., has been placed in 100% production of cold rubber. The plant was put in production in August, 1943, and has been in continuous operation since then. It was one of eight selected to maintain production, while the others were put in standby condition at the end of World War II.

The Research Laboratory of the Goodyear Tire and Rubber Co. has announced a major improvement in the production of an odorless synthetic latex for use in foamed cushioning. Developed by Goodyear in a research and development program sponsored by the RFC Synthetic Rubber Division, the new latex is being produced on a pilot plant scale at the Goodyear-operated, government-owned synthetic plant in Akron.

The new latex is described as "cold" polybutadiene. The styrene used heretofore with butadiene in "cold" latex production has been entirely eliminated, the company stated. Now identified by the government as Type X-653, the new latex has been in experimental production for several months at Akron.

The synthetic rubber program has been assured of all the alcohol it will need in 1952, according to Mr. Spencer. Mr. Spencer said that the RFC Synthetic Rubber Division has fulfilled its commitments for the balance of 1952 mostly with alcohol processed or being processed from damaged grains.

Mr. Spencer also stated that if current demand does not pick up, RFC may cut back production of GR-S based on alcohol. He said that synthetic made from alcohol cost 38c a pound as against 18c from rubber made from petroleum.

OPS Pricing Developments

The question of what price control pattern should be established to govern the direct purchase and sale of natural rubber following the discontinuance of exclusive federal operation in this field was explored on March 18 by members of the newly-created Crude Natural Rubber Advisory Committee and officials of the Office of Price Stabilization. Discussion at the meeting related to the type of regulation which OPS should consider, other than the General Ceiling Price Regulation. Also considered was the desirability of adopting an amendment to CPR 31, which governs margins of importers, or of establishing a tailored regulation to conform to practices in the rubber importing trade. The timing of such possible action was also considered. Because the emergency procurement service of the government heretofore has controlled the importation and sale of natural rubber, in both dry and latex form, there has been no problem for OPS in respect to price control.

The members of the Crude Natural Rubber Industry Advisory Committee are: James F. Adams, Oak Park, Ill.; R. B. Bogardus, Goodyear Tire & Rubber Co., Akron, Ohio; S. G. French, H. W. French Co., New York City; Alan L. Grant, Charles T. Wilson Co., Inc., New York, City; D. A. Paterson, H. A. Astlett Co., New York City; Lawrence B. Proctor, Farr and Co., New York City; Robert D. Reilly, Imperial Commodities Corp., New York City; Edward C. Schwab, United States Rubber Co., New York City; J. M. Slattery, Mansfield Tire and Rubber Company, Mansfield, Ohio, and H. F. Van Valkenburgh, Dunlop Tire and Rubber Corp., Buffalo, N. Y.

Phthalate Plasticizer Ceilings

On April 1 in SR-24 to CPR 22, OPS spelled out uniform dollars-and-cents ceilings for manufacturer sales of certain dioctyl phthalate-type plasticizers. The new ceiling prices replace present individual ceilings determined in accordance with CPR 22, and are for tank car lots with minimum transportation costs allowed east of the eastern borders of Idaho, Utah and Arizona.

The regulation also provides that for other volumes and for delivery west of these states' eastern borders, each seller must maintain the terms and conditions of sale he had in effect during the period December 19, 1950, to January 25, 1951. The uniform ceilings established by the regulation are approximately the level of individual ceilings under CPR 22.

Goodrich Named in Trust Suit

B. F. Goodrich Co. and one of its directors, Sidney J. Weinberg, have been named in civil suits recently filed by the Justice Department in a nationwide drive against interlocking directorships. Mr. Weinberg is a partner in Goldman, Sachs & Co. He is also a director of Goodrich, a member of its Executive Committee as well as a member of the board of Sears, Roebuck & Co. The suit naming the two companies and Mr. Weinberg stated that Sears and Goodrich have 124 retail stores in the same communities and compete in the sale of tires and other automobile accessories and other products. The petition also contends that Sears sells at retail by mail order in competition with all 490 Goodrich stores. Mr. Weinberg, a prominent financier, served as deputy director of the War Production Board during the last war and for a time was chief aide of Charles E. Wilson, defense mobilization director in the current program.

Dural Rubber Granted RFC Loan

Dural Rubber Co. of Flemington, N. J., on recommendation of the Small Defense Plants Administration, has received a load of $100,000 from the Reconstruction Finance Corp. The loan was the thirteenth made throughout the country on the recommendation of the agency. Loans to date total $905,100. They are disbursed from a $100,000,000 fund for this purpose created under Section 714 of the Defense Production Act. Applicants apply for loans at regional RFC offices and are passed along to the SPDA for examination and recommended action.

BRITISH TRADE BOARD REPORTS MOUNTING RUBBER SALES TO REDS

Rubber has become a major British export to Russia, the British Government's Board of Trade reported on March 16th. In January, the last month for which complete trade figures are available, Britain shipped 12,260 tons of raw rubber to Russia from British ports. In the six months ended last January 30, rubber exports to Russia totaled 45,348 tons.

During the five months preceding the Korean war, British rubber shipments to Russia amounted to only 30 tons, or an average of six tons per month. The pre-Korean average to January's figure is an increase of more than 2,000 per cent. The January shipments earned Britain more than $14,000,000. During 1951, Britain received 55 millions from raw rubber sold direct to Russia.

The shipments do not include any sales of British rubber to Russia thru China. The sales via China became so great in the early days of the Korean war that the British parliament demanded an investigation. Although the sales were camouflaged, the investigators were able to trace the sale of 120,000 tons of rubber in nine months.

The British government, prodded by demands from the American government and public, at that time issued orders which it said would prevent Russia from acquiring British rubber for war purposes. Sales of British rubber were supposed to be made henceforth only with the approval of the British government.

Large quantities of rubber still are being smuggled into Russia via China, observers report. It is assumed, however, that all recent shipments of rubber direct from British ports to Russia have received the Churchill government's blessing. January's shipment of 12,260 tons is an all-time peak. The highest monthly shipment under the previous Socialist government was 9,978 tons last August.

Firms Protest Tire Ruling

The "Big Four" on March 4 filed suits in the United States District Court for the District of Columbia to enjoin the Federal Trade Commission from enforcing its recently-announced quantity limit ruling, and to declare the ruling invalid. Later, the Seiberling Rubber Co., the Carlisle Corp., and the Durkee-Atwood Co. brought similar suits protesting the FTC decision. In a surprise move, 35 tire dealers, most of them in Chicago, also brought suit to block the federal ruling. The National Independent Tire Dealers Association, Inc., however, has been solidly behind the FTC decision. The ruling is the first to be made by the FTC under the quantity limit provision of the Robinson-Patman Act, which has never been tested in the courts. It would impose an upper limit of one carload as the quantity of replacement tires upon which a maximum discount may be granted. Generally, the companies contend that the decision, if allowed to go into force, would disrupt the tire industry and would be against the interests of both tire dealers and consumers.

RECONSTRUCTION FINANCE CORP. REVISING GR-S IDENTIFICATION

During the past few years the number of standard, special and experimental types of GR-S manufactured and distributed has increased substantially. As the number of types have increased so have the problems of production and distribution. The result has been an increase in the cost of production and distribution, a decrease in the efficiency of operations, a delay in delivery to consumers and substantial variations in the quality of the product because of short production runs.

The Rubber Industry Advisory Committee has consistently urged the Synthetic Rubber Division of the Reconstruction Finance Corp. to make a reduction in the number of types. In order to comply with this recommendation, RFC has made an extensive study of the polymers currently produced and has eliminated those which, in its views, generally represent duplications of other polymers. RFC has established a new system of numbering polymers. This action will become effective July 1, 1952, in order to allow consumers a reasonable period of time to make an orderly transition to the new code numbers. As a guide in selecting the polymers that will be available after July 1, 1952, the following principles have been applied:

(1) All hot rubber will contain 23.5% bound styrene and all cold rubber will contain 20% bound styrene.

(2) All hot rubber will be polymerized in an activated recipe.

(3) Carbamate will be the shortstop for all reactions, hot or cold.

(4) In general, three types of polymers will be made—staining, non-staining and slightly staining. Staining stabilizers will be BLE and PBNA used on an interchangeable basis. Non-staining stabilizers will be Wingstay S and Polygard used on an interchangeable basis. The slightly staining polymers will be stabilized with Stalite.

(5) All cold rubber, with the exception of 100% fatty acid emulsified types, will be polymerized in a standard sugar-free, iron-activated recipe.

(6) In emulsifying cold rubber there will be three types of emulsification: 100% rosin acid, 50/50 rosin/fatty acid, and 100% fatty acid.

(7) The standard loading for carbon black masterbatches will be 50 parts of black on 100 parts of polymer.

(8) Philblack O, Aromex, and Vulcan 3 will be designated HAF blacks and will be used interchangeably.

(9) In the production of oil-rubber masterbatches, Circosol 2XH, Sundex 53, Shell SPX-97, Dutrex 20 and similar types will be used interchangeably under the general classification "processing oils."

(10) In order to be classified as a different polymer, the mean Mooney viscosity of the polymer must be at least 15 points removed from the mean Mooney viscosity of another polymer of the same composition.

(11) RFC will continue to issue "X" numbers for experimental polymers. After issuance, an "X" number may continue in production for a maximum of six months. At the conclusion of this period, it will be discontinued or a regular number assigned.

(12) As soon as practicable, RFC will establish specifications for all raw materials to be incorporated in GR-S polymers. At such time, suppliers of raw materials will submit their products to the Materials Procurement Branch, Synthetic Rubber Division, RFC, and upon approval such materials will be used interchangeably.

RFC's new system for numbering polymers, referred to herein, follows:

NEW GR-S CODE IDENTIFICATIONS

Type	Series
Hot non-pigmented	1000 Series
Hot pigmented	1100 Series
Hot oil	1200 Series
Hot oil black	1300 Series
Cold non-pigmented	1500 Series
Cold pigmented	1600 Series
Cold oil	1700 Series
Cold oil black	1800 Series
Hot latex	2000 Series
Cold latex	2100 Series
"X" Numbers	"X" Series

NEW DESIGNATIONS OF POLYMERS TO BE OFFERED FOR SALE JULY 1

For the convenience of our readers we have prepared the following table to enable users of GR-S to quickly determine the new RFC code designations for polymers currently in use. These new code designations become effective July 1, 1952. Use of the term "None" in the second column opposite certain "X" numbered polymers indicates that that polymer is still in the experimental stage and has not yet been given a code designation.

Old Polymer Numbers	*New Designations*
BLACK MASTERBATCHES	
Black I	1100
Black III	1100
Black IV	1100
GR-S POLYMERS	
GR-S	1000
GR-S-10	1002
GR-S-18	1003
GR-S-20	1000
GR-S-21	1006
GR-S-25	1006
GR-S-26	1006
GR-S-50	1001
GR-S-60	1008
GR-S-62	1009
GR-S-65	1007
GR-S-86	1012
GR-S-100	1500
GR-S-101	1500
GR-S-AC	1004
GR-S-10 AC	1005
GR-S-20 AC	1004
GR-S-30 AC	1010
GR-S-40 AC	1013
GR-S-60 SP	1017
GR-S-61 SP	1018
GR-S-65 SP	1016
GR-S-66 SP	1019
GR-S-86 SP	1012
LATICES	
Type II	X-695
Type III	2000
Type IV	2000
Type V	2003
Type VI	2005
EXPERIMENTAL POLYMERS	
X-12	1004
X-360	1101
X-381	2001
X-419	1104
X-433	1102
X-446	2002
X-489	1015
X-491	1014
X-523	X-695
X-547	2100
X-567	1012
X-579	1103
X-580	1600
X-598	1601
X-600	1505
X-607	1601
X-608	1601
X-617	X-617
X-619	X-619
X-625	1502
X-628	1700
X-629	1800
X-630	1000
X-631	1001
X-633	None
X-637	1501
X-640	1009
X-641	1002
X-644	1010
X-645	1011
X-647	1500
X-650	1002
X-653	2004
X-654	1700
X-655	1002
X-656	1601
X-660	1701
X-663	1701
X-667	None
X-668	None
X-670	1500
X-671	1000
X-675	1009
X-678	None
X-682	None
X-683	None
X-684	None
X-685	1010
X-686	1800
X-691	None
X-692	None
X-693	None
X-694	1001
X-696	1701
X-699	1702
X-700	1700
X-701	None
X-702	1018
X-703	1019
X-704	1009
X-706	X-706
X-278 SP	1021
X-496 SP	1022
X-549 SP	1020
X-565 SP	1503
X-601 SP	1504
X-620 SP	1503
X-627 SP	1023
X-674 SP	1022
X-697 SP	1504

Join Dewey and Almy Staff

Two engineers have been added to the staff of the Acton, Mass., plant of Dewey and Almy Chemical Co.—one in the Polymer Division, and one in the plasticizer plant. Harold W. Flood has been assigned to the new plasticizer plant where he will assist in getting production underway. O. Benjamin Hander has been assigned to the polymer plant where he will handle special production problems. Mr. Hander was previously chemical engineer at Humble Oil and Refining Co., Baytown, Texas. From 1948 to 1951 he was loaned by Humble to RFC, where he was manager of production control of synthetic rubber in the Office of Rubber Reserve. He is a 1942 graduate of Rice Institute where he received his B.S. in engineering. Mr. Flood was previously chemical engineer at Humble Company of America, Baltimore, Maryland, and is a chemical engineering graduate of the Missouri School of Mines. Prior to joining Mutual in 1947 he was with the Freeport Sulphur Co., Freeport, Texas. During the war, he served in the Army.

ACCELERATED TAX AMORTIZATION APPROVED BY DPA FOR TIRE FIRMS

From time to time the Defense Production Administration has announced the issuance of Certificates of Necessity for accelerated tax amortization of new or expanded defense facilities. Until recently, many certificates were issued to companies involving many different types of rubber products. Very few certificates, however, were issued to tire companies to provide for new or expanded facilities. Recently, DPA has authorized many such certificates to most tire producers. The names of the companies, locations and the amounts certified, follow:

Armstrong Rubber Co., West Haven, Conn., $3,365,615 for tires and tubes.

Cooper Tire & Rubber Co., Findlay, Ohio, $982,381 for military truck tires.

Dayton Rubber Co., Dayton, Ohio, $5,041,440 for military tires and tubes.

Firestone Tire & Rubber Co., Akron, Ohio, $440,000 for military tires; Akron, Ohio, $278,400 for military tires; Akron, Ohio, $110,000 for military tires; Des Moines, Iowa, $8,806,245 for military tires; Des Moines, Iowa, $739,000 for military tires; Los Angeles, Calif., $231,630 for military tires; Memphis, Tenn., $494,400 for military tires; Memphis, Tenn., $1,144,589 for military tires; Pottstown, Penna., $132,500 for military tires; Pottstown, Penna., $2,216,050 for military tires.

Gates Rubber Co., Denver, Colo., $112,360 for military tires; Denver, Colo., $1,112,000 for military tires.

General Tire & Rubber Co., Akron, Ohio, $2,310,600 for military tires.

B. F. Goodrich Co., Los Angeles, Calif., $2,434,533 for military tires; Los Angeles, Calif., $64,356 for military truck tires; Miami, Okla., $299,698, for military truck tires; Miami, Okla., $122,994 for military tires; Miami, Okla., $3,459,475 for military truck tires; Miami, Okla., $581,588 for military tires; Oaks, Penna., $305,540 for military tires; Oaks, Penna., $218,162 for military truck tires; Tuscaloosa, Ala., $909,300 for military tires.

Goodyear Tire & Rubber Co., Akron, Ohio, $2,890,420 for military truck tires; Akron, Ohio, $191,535 for military tires; Gadsden, Ala., $286,060 for military truck tires; Jackson, Mich., $5,670,910 for military truck tires; Topeka, Kansas, $13,627,136 for military truck tires.

Lee Rubber & Tire Corp., Conshohocken, Penna., $488,600 for military truck tires; Conshohocken, Penna., $76,700 for military truck tires; Conshohocken, Penna., $221,450 for military tires; Conshohocken, Penna., $725,492 for military tires.

McCreary Tire & Rubber Co., Indiana, Penna., $217,121 for military truck tires.

Mansfield Tire & Rubber Co., Mansfield, Ohio, $226,737 for military truck tires.

Mohawk Rubber Co., Akron, Ohio, $1,206,400 for military truck tires.

Pacific Tire & Rubber Co., Oakland, Calif., $22,564 for military tires; Oakland, Calif., $3,400 for military truck tires; Oakland, Calif, $10,994 for military truck tires; Oakland, Calif., $146,625 for military tires.

Seiberling Rubber Co., Akron, Ohio, $385,320 for military truck tires.

U. S. Rubber Co., Detroit, Mich., $184,530 for military tires; Chicopee Falls, Mass., $248,402 for military tires; Detroit, Mich., $160,000 for military tires; Detroit, Mich., $1,133,059 for military tires; Detroit, Mich., $33,173 for military tires; Eau Claire, Wisconsin, $5,292,700 for military tires; Los Angeles, Calif., $1,247,300 for military tires; Los Angeles, Calif., $181,280 for military tires; Los Angeles, Calif., $62,403 for military tires.

Certificates of Necessity for items other than tires and tubes have been issued to the following companies in recent weeks:

Akron Standard Mold Co., Greenwich, Ohio, $120,332 for rubber processing machinery for military end items.

Dow Chemical Co., Midland, Mich., $182,280 for styrene.

E. I. du Pont de Nemours & Co., Orange, Texas, $6,195,000 for polyethylene.

Jefferson Chemical Co., Inc., Port Neches, Texas, $145,000 for butadiene and butylenes.

Frank G. Schenuit Rubber Co., Baltimore, Md., $33,914 for aircraft tire testing.

Monsanto Chemical Co., Springfield, Mass., $2,685,000 for polyvinyl chloride film.

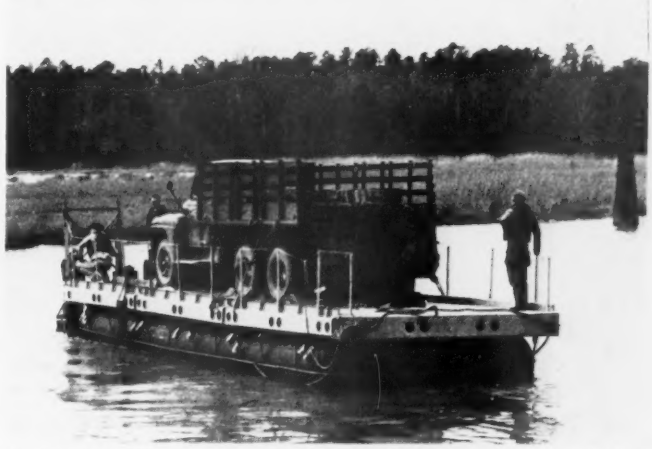
Collyer Insulated Wire Co., Central Falls, R. I., $30,573 for electric cables for U. S. Navy.

Gates Rubber Co., Denver, Colo., $1,112,000 for power transmission belts.

Chemists See Cabot Films

Two sound films made by Godfrey L. Cabot, Inc., of Boston, Mass., were shown to approximately 100 rubber chemists and technologists of the Northern New Jersey area at the Passaic City Club in Passaic, N. J., on March 31. The films were "Inside the Flame," which shows the production of carbon black of both channel and furnace types, and "Good Company," which outlines the numerous advantages offered by the company to its employees. A dinner preceded the showing. B. A. Wilkes, Cabot technical sales representative, acted as host and answered some questions on the blacks after the films were shown.

SEIBERLING RUBBER DEVELOPS NEW TYPE PORTABLE BARGE FOR U.S. ARMY



Loaded with a 2½ ton truck and other cargo, the new barge developed by Seiberling Rubber for the Army, undergoes tests at Ft. Eustis, Va. The 36-foot inflatable barge can carry 16 tons of equipment. It is propelled by two outboard motors or it can be towed. Two or more of the barges can be strapped together to form a bridge or dock.

A new type portable barge, made of rubberized fabric, has been developed for the U. S. Army by Seiberling Rubber Co. Seiberling Rubber said that the Army's Transportation Corps is now putting the new barge through tests at Ft. Eustis, Va. The inland water barge is capable of carrying 16 tons of machinery, trucks, or other heavy cargo, the company reported. The barge, made of three sausage-shaped tubes which support an aluminum deck, is 36 feet long and 12 feet wide, but can be rolled into a package three feet high and ten feet long which can be transported by plane. Two or more of the barges can be lashed together to form a quickly-assembled dock, the company announcement said. Both the floating portion of the barge and the aluminum deck sections are designed for this. The new inflatable barge was developed by the company's New Product Department to meet general specifications outlined by the Army. No contract has been awarded for production of the floats, the company said. First tests of the barge were very successful, according to the announcement. During one test it carried a loaded 2½ ton truck and other cargo. The barge is propelled by two 25-hp outboard motors, or it can be towed.

ONLY SEVEN CENTS REMAIN FROM TIRE FIRMS' DOLLAR LAST YEAR

According to a recent article in the *Akron Beacon Journal*, it cost Akron's six tire companies 93c to do $1 worth of business in 1951, their greatest sales year of all time. Out of the 7c left from every dollar came the money set aside for depreciation to replace worn-out equipment, a little added to reserves for a "rainy day", and a balance for profit.

The depreciation account was allowed 1 4/5 cents out of every dollar and 4/5 of 1c went for reserves. This enabled the companies to wind up with a profit of 4 2/5 cents per dollar of income. The year before they earned 5c per dollar. In other words, business costs were up slightly—1c per dollar—and profits were down. These are some of the facts gleaned from a summary of the 1951 financial statements of the six corporations.

The report states that unquestionably the two most significant developments of the year were the high sales and the tax picture. Combined sales and other income rose to $2,965,572,965, a new peak. This is an increase of $697,000,000, or 30% over the 1950 sales figure. The year 1951 also marked the first time a rubber firm (Goodyear) entered the exclusive billion-dollar sales circle.

Direct taxes, mostly of the federal income and excess profits variety, rolled on to a record $270,215,025, up $117,000,000 or 76% from the previous year. Taxes amounted to more than twice the profits. Other assessments such as social security, excise or sales taxes paid or collected by the firms are not included in this figure.

Earnings Fall Behind Sales

As in most other industries, earnings fell well behind the pace set by sales. Total profits climbed $15,000,000 or 13%. This was due almost entirely to the exceptional performance of Firestone which had a profit increase of $15,000,000 or 45%. Firestone's achievement was made possible, even in the face of the unprecedented tax burden, by the banner production of its Liberian rubber plantations during a year when rubber prices shot to a 25-year high.

After paying all their bills, Akron firms came out of 1951 with a combined profit of $129,076,751. This is equivalent to 4.4% of their income. Out of this amount, $44,044,032, or 1½c out of every dollar taken in, was paid in dividends to the 96,812 individuals and institutions who own the companies—the stockholders. The $85,032,719 in profit that was left after paying dividends was retained in the businesses to finance expansions and new equipment and to provide working capital.

Largest portion of the 93c required to do a dollar's worth of business—60.1c—went for materials. This includes such things as rubber, fabrics, chemicals, steel, power, transportation and the hundreds of other items necessary in modern manufacturing. Akron tire firms spent $1,785,066,423 for these items as compared with 1½ billion dollars the year before.

Next came the wages and salaries which took 23.3c out of every dollar. Included in this bracket are also social security taxes of the employers, pensions, vacations, insurance payments and workmen's compensation. The wage and salary bill totaled $691,896,709.

Taxes were the third biggest business cost. Last year, taxes took $270,215,000 out of total income, or 9.1c out of every dollar received. Three hikes in corporate taxes since the Korean war have pushed these assessments to a new high. Personal income taxes have been boosted twice, the article stated.

All of the 11 major tire producers, including the six Akron companies, broke their own sales records in 1951. These gains ranged from 14% by Seiberling Rubber to 81% by Mohawk Rubber. Firestone's 45% increase topped the larger firms. Mansfield Tire, an affiliate of General Tire, retained sixth place in sales among concerns issuing financial reports. It is believed that Gates Rubber exceeded Mansfield Tire's $63,000,000, but Gates Rubber is a privately-owned firm and does not issue a statement.

Dayton Rubber Sales Increase

Largest increase achieved by any firm except Mohawk Rubber was Dayton Rubber. Tenth in sales in 1950, Dayton Rubber moved into seventh last year passing Lee Rubber, Armstrong Rubber and Seiberling Rubber. Seven of the companies showed higher profits than the year previous. The four that didn't despite increased sales were General Tire, Mansfield Tire, Lee Rubber and Seiberling Rubber. They attributed the drop in earnings to such factors as higher rubber costs, restricted production and the much greater tax burden.

Armstrong Rubber, which supplies Sears, Roebuck & Co. with its tires, made the best earning record of all companies—5.6% of sales. Goodrich again topped the major companies with a profit of 5.4% for every dollar of sales, although its earnings were up only 1/10 of 1% over 1950. Mohawk Rubber, with also the biggest profit increase—80%—earned 5.1% of sales.

TIRE COMPANY SALES AND PROFITS IN 1951

	1951 Sales	Pct. Gain Over 1950	1951 Profits	Pct. Gain or Loss to '50	Ratio Profits To Sales	Earnings Per Share
Goodyear	$1,101,141,392	30%	$36,628,000	4%	3.3%	$ 8.18
Firestone	$ 975,766,455	41%	$48,398,950	45%	4.9%	$12.26
U. S. Rubber	$ 837,222,092	20%	$30,366,449	23%	3.5%	$14.29
Goodrich	$ 637,722,241	17%	$34,742,881	.1%	5.4%	$ 8.15
General	$ 170,771,521	36%	$ 7,790,467	–9%	4.5%	$12.48
Mansfield	$ 63,431,000	34%	$ 2,290,000	–11%	3.6%	$12.50
Dayton	$ 54,602,904	47%	$ 2,380,938	6%	4.4%	$ 5.01
Lee Rubber	$ 50,402,406	28%	$ 2,185,632	–26%	4.3%	$ 8.62
Armstrong	$ 50,325,336	21%	$ 2,832,393	22%	5.6%	$ 7.28
Seiberling	$ 43,681,425	14%	$ 1,216,574	–33%	2.8%	$ 3.30
Mohawk	$ 20,884,078	81%	$ 1,072,312	80%	5.1%	$ 7.57

Tire Price War Pending?

According to trade sources, tire manufacturers are beginning to be a bit uneasy over the heavy, high-priced inventories they have been building over the past few months. Tires aren't selling despite industry anticipation of a strong replacement demand this spring. A recent survey of the New York area by the *Journal of Commerce* revealed that dealers are resorting to drastic price reductions in order to liquidate standing stocks. In most cases the results haven't been too satisfactory. In the light of these developments, some in the field are of the opinion that a price war may be imminent. Indicative of the fact that tires and tubes have not been moving as expected, the Seiberling Rubber Co. has temporarily cut back schedules on these items to a five-day week. These schedules will continue until business "opens up." Previously, operations were on a six-day basis.

Protox-168 Zinc Oxide

New Jersey Zinc Co., New York, N. Y., has announced what is said to be the first French Process zinc oxide which has been surface-treated with propionic acid. Made by a modified French Process, "Protox-168" offers finer particle size with a specific surface area of 8 square meters per gram. Conventional French Process zinc oxide has 3.5 meters. Protox-168 is prepared by treating Kadox-72 with propionic acid. The product has outstanding dispersion characteristics resulting in improved tensiles, tear and modulus.

Announces New Plant in South

General Latex and Chemical Corp., Cambridge, Mass., has announced it will open a new Southern Plant in Dalton, Georgia, in June, 1952. The new plant will contain the most modern latex compounding and processing equipment, as well as its own research and development laboratory and testing laboratory. Robert H. Elwell has been named general manager of the new plant.

NSC ANNOUNCES 1951 WINNERS OF RUBBER SECTION SAFETY CONTEST

The National Safety Council has announced the 1951 award winners in the Rubber Section Safety Contest. During 1951, the contestants in the Rubber Section contest operated 404,716,000 man-hours and during that time experienced 2,305 injuries. Compared with the final figures for the 1951 contest, this represents an increase in the exposure and injuries of 27% and 31%, respectively.

The final average cumulative rate for all contestants was slightly higher than for the preceding contest. The increase in rate, however, was due to the adverse experience of new contestants. Basing its computations on the experience of identical companies, those which were in both the 1950 and 1951 contests, NSC found that the average twelve-month rate in 1951 was 14% lower than in 1950.

In Division I, which includes those plants averaging over 400,000 monthly man-hours, the Los Angeles, Calif., plant of the Firestone Tire & Rubber Co. of California took first honors with an accident frequency rate of .62. The Mishawaka, Ind., plant of the U. S. Rubber Co. took second place with a .79, while the Goodyear Tire & Rubber Co. plant in England took third place with 1.04. The average accident frequency rate for all company plants in Division I in 1951 came to 3.75.

Division II includes those plants in which average man-hours worked fall between 200,001 and 400,000. The average frequency rate for this division for 1951 was 6.02. First place was taken by the Dryden Rubber Co., Division of the Sheller Manufacturing Co. The Chicago plant of the company had no accidents in 1951. Plant 4 of the B. F. Goodrich Co. at Akron took second place with a score of .41. The Akron Aeronautical Division of the same company took third place with an average frequency rate of 1.07 for the twelve-month period.

Those plants with average monthly man-hours worked between 100,001 and 200,000 fall into Division III. These plants had a frequency rate of 8.32 in 1951, with first place going to the Goodrich plant at Tuscaloosa, Ala., which had no lost-time accidents during the twelve months. Xylos Rubber Co., a division of Firestone, took second place with a score of .52, while the Milan, Ohio, plant of U. S. Rubber took third place with .57.

Division IV plants cover those installations where 50,001 to 100,000 monthly man-hours are worked. The Division, as a whole, had an accident frequency rate of 11.20 for 1951. The Port Neches, Texas, plant of the B. F. Goodrich Chemical Co., the Lake Charles, La., plant operated by Firestone, and the Goodrich plant at Cadillac, Mich., all recorded no lost-time accidents in 1951.

Those plants working less than 50,000 man-hours a month comprise Division V. The Accident frequency rate for the division was 12.49. The Firestone Plastics Co. at Pottstown, Penna., the University of Akron and the Du Bois, Penna., all had a score of .00, or no lost-time accidents during 1951.

Arch Named Works Manager

Vincent Arch

Vincent Arch, associated with the Vulcanized Rubber and Plastics Co., Morrisville, Penna., for almost 25 years, has been appointed works manager of the company. For the past six months, Mr. Arch had held the position of assistant works manager. Previously, he was rubber superintendent for the company.

McKenna Forms Own Business

Charles F. McKenna, Jr., a veteran of 30 years experience in the organic chemical and process industries, has established an office at 2300 Connecticut Avenue, Washington, D. C., where he will represent industrial groups operating in the chemical and chemical process industries. His experience over the past three decades has been in the fields of research and development, sales, technical service and management. For the past year he has been Washington representative for all divisions of the General Aniline & Film Corp. Prior to joining General Aniline in 1945, Mr. McKenna was with the Commercial Solvents Corp. for 17 years in the Market Development and Sales Departments. He holds a B.S. degree in chemistry.

Mansfield Votes Stock Split

Stockholders of the Mansfield Tire & Rubber Co., Mansfield, Ohio, at a special meeting approved a three-for-one split of the common stock of the company. Also approved was an increase in authorized common stock to 750,000 shares of $5 par value. The previous authorization totaled 225,000 shares. Three shares of the new stock will be exchanged for each share of no par value stock. Approval of the stock split and the increase in stock paved the way for the declaration of a first quarter dividend of 40c per share, which was paid on March 20 to stockholders of record on March 12. The dividend places the stock on a regular annual basis of $1.60 per share, payable 40c quarterly.

An index to Volume 70 of RUBBER AGE will be found on Pages 139 to 142 of this issue.

COLOR CHANGE IN SULFUR NO REFLECTION ON PURITY

Rubber compounders using sulfur may have noticed a slight change in the sulfur they have been receiving of late. If not, then the chances are they will note such a color change in supplies reaching them in the next few months. The reasons for this change in color tone, supplied by the Stauffer Chemical Co., are explained below.

The most important commercial deposits of sulfur occur in sedimentary beds associated with hydrocarbons. The presence of sulfur in these deposits or "salt domes" as they are called was discovered years ago in oil-drilling exploration along the Gulf Coast, in Louisiana and Texas. Sulfur is still being taken from these deposits, but the color is changing.

The well-known Frasch process is employed to melt the sulfur *in situ*, 1000 feet or more below the surface, and raise the melt to the surface. Yellow sulfur of better than 99.5% purity has been pouring from these deposits for close to 50 years, and in quantity which has, until a few years ago, been ample to supply the United States and a large part of the foreign demand for elemental sulfur.

Now, with increasing demands and depletion of the older workings, it is not surprising to find new qualities in the sulfur which is coming from some of the more recently developed deposits. So-called "dark" sulfur has been produced and supplied to the chemical industry for a number of years. It now appears probable that even larger quantities of American crude sulfur will be of this relatively new "dark" type.

Rubbermakers' sulfurs made directly from these new crudes will be off-yellow in color, somewhat on the beige side. The purity, however, will remain 99.5% or better. The organic impurity fraction will be up slightly and will include more free hydrocarbon oil than is normally detected in the native yellow crude sulfurs. The free oil may run as high as 0.1% associated with an equal fraction of a variable complex of organic sulfur compounds. Yellow crudes have contained these, or closely similar impurities, in slightly smaller fractions. The difference in color would appear to indicate a difference in the composition of the oil associated with the sulfur.

It is believed that rubbermakers' sulfur prepared from these less bright crudes will be reaching the rubber manufacturing industry within the near future. According to Stauffer Chemical, there is no practical reason to assume that the performance will be different or less satisfactory than in the past.

Wilsolite Corp. Changes Name

The name of the Wilsolite Corporation, 501 Amherst St., Buffalo 7, N. Y., manufacturers of custom molded and industrial rubber products, has been changed to the Keystone Mounts Corporation. No change has been made in management or personnel, the company said.

DIVISION OF HIGH-POLYMER PHYSICS, A.P.S., HOLDS INTERESTING MEETING

The Division of High-Polymer Physics of the American Physical Society held its Tenth Meeting at Columbus, Ohio on March 20, 21 and 22, 1952, jointly with a meeting of the parent society. Two symposia relating to the physics of high polymers, along with three sessions for contributing papers were arranged by the Program Committee, headed by Rolf Buchdahl.

Maurice L. Higgins has been elected division chairman for 1952, while Raymond F. Boyer was elected vice-chairman. W. J. Lyons was re-elected secretary-treasurer. Elected to a three-year term on the Executive Committee was L. A. Wood, a former division chairman. A number of papers of particular interest to the rubber industry were presented at the meeting. Abstracts of these papers, their authors and company connections, follow:

A New Approximate Conversion Method for Relating Stress Relaxation and Dynamic Modulus. ***Robert S. Marvin (National Bureau of Standards).*** It is of interest to relate the results of transient and dynamic measurements of the mechanical properties of matter, both as a check on the results and to permit a unified presentation of mechanical behavior over a wide range of frequencies. The difference between the real part of the dynamic modulus at a radian frequency $1/t$, $G'(1/t)$, and the stress relaxation function at a time t, $\Psi(t)$, may be written

$$G'(1/t)-\Psi(t)=\int_0^\infty \left[\frac{\tau^2/t^2}{1-\tau^2/t^2}e^{-1/\tau}\right] g(\tau)\,d\tau,$$

where $g(\tau)$ is the Maxwell distribution of relaxation times which can be evaluated approximately from either type of measurement by graphical differentiation. Since the terms on the left are nearly equal, the transformation from one to the other can be effected with a high degree of precision and with relative ease. Data on a high molecular weight polyisobutylene taken by a number of investigators as part of a cooperative program are used to illustrate the method.

Correlation of Dynamic and Static Measurements on Rubber-Like Materials. II. ***R. D. Andrews (Dow Chemical Co.).*** Static modulus (relaxation of stress), dynamic modulus and dynamic loss measurements on rubber-like materials can all be correlated in terms of the relaxation time distribution which characterizes the particular material under consideration. In carrying out calculations to relate these properties to the relaxation time distribution or to one another, it is very convenient to have approximate relationships which can be conveniently used. The present paper extends the investigation of approximate relations begun in the first paper of this series. More general derivations are given of some of the specific results derived previously. Second approximation expressions are derived which differ from those obtained in the preceding paper. The distribution of relaxation times for a polyisobutylene sample is calculated from relaxation of stress data to illustrate the application of the second approximation expression for the static modulus case. Static modulus measured by creep experiments is related to a distribution function of retardation (or orientation) times. First and second approximation expressions which can be used in this case are derived.

Viscoelastic Properties of Polymers by Phase Angle Measurements. ***R. D. Spangler.*** Equipment has been devised to measure the mechanical phase angle of polymers. Specimens are subjected to forced vibrations of 20 or 30 cycles per second at stress levels up to the ultimate strength of the materials. Measurements can be made on molded plastic specimens, on polymer melts, and on monofilaments and cords. From phase angle measurements the viscous and elastic components can be calculated. The elastic component of some polymer melts has been shown to be approximately equal to the viscous component. Data will be presented for a number of plastics including FM 10001 Nylon, FM 3001 Nylon, "Lucite" acrylic resin, and "Alathon" polythene resin.

Acoustic Properties of Rubber as a Function of Chemical Composition. ***William S. Cramer and Irving Silver (Naval Ordnance Laboratory).*** An experimental study was made of the bulk and Young's moduli of elasticity at selected audiofrequencies for various natural and synthetic rubber compositions. Both results are expressed in the form of a complex modulus, $E(1+i\eta)$, where η is the loss factor or loss tangent. The bulk data were obtained with a resonant water column at 30°C and 1530 cps. Observations were made of the change in Q and shift in resonant frequency when the sample is inserted in a pressure antinode of the column. The Young's modulus was calculated from measurements on the velocity and attenuation of progressive waves in thin rubber rods. These measurements were carried out at 30°C over the frequency range 1 kc/s to kc/s. Graphs are presented showing variations of acoustic properties as functions of type and amount of filler or plasticizer. Special attention was given to carbon black fillers ranging in size from 30 to 200 microns and to non-reinforcing fillers such as titanium dioxide and diatomaceous earth. In general, the real part of both moduli increased and the loss factors decreased with loading. The variations of the moduli with loading changed substantially with types of filler and of rubber.

Self-Diffusion and Bulk Viscosity of High Polymers. ***F. Bueche (Cornell University).*** In spite of its fundamental importance for an understanding of the physical properties of solid polymers, little is known about the rate of molecular diffusion in such systems. This paper will outline some results obtained from radioactive tracer measurements of the self diffusion constant, D, in polystyrene and poly *n*-butylacrylate. A theoretical treatment of its relation to η, the bulk viscosity, will also be given. The experiments confirm a theoretically derived relation that $D\times\eta$ equals a constant composed of known qualities. Moreover, simple considerations have led to a relation for the bulk viscosity of solid polymers which agrees with experimental data available for polystyrene and polyisobutylene. Some success has been achieved in evaluating the segmental jumping frequency from a knowledge of bulk viscosity. The values thus found are in substantial agreement with those inferred from dielectric data—at least at the so-called second-order transition temperature.

Strain-Temperaure Studies of Transitions in Rubbers. ***R. J. Derenthal, F. P. Baldwin, and R. L. Anthony (University of Notre Dame).*** Previously reported studies of the apparent second-order transition in rubbers by the length-temperature method (constant stretching load on sample) indicated an unusual dependence of the transition temperature, T_L, upon the initial tension strain, ϵ_0, of the sample. T_L was found to first increase as ϵ_0 was increased from zero to the thermoelastic inversion extension (about 7 percent) then to decrease with further increase in ϵ_0; finally, for some rubbers, T_L appeared to level off at higher extensions. These studies have been continued. In addition, a study of the dependence of the transition temperature upon shearing strain was undertaken. Results for several rubbers indicate no dependence of the transition temperature upon initial shearing strain for strains ranging from 0 percent to about 13 percent, in sharp contrast to the behavior observed in length-temperature studies. The experimental methods employed in this work will be described, and the results obtained from both types of measurements will be discussed. It is not yet possible to specify the frequency spectrum for any of the materials studied (Cellophane, Nylon, and vinylidene chloride copolymers) because many of the patterns exhibit multiple effects. While the amplitude is generally decreasing with frequency secondary maxima appear in various parts of the record. These results are consistent with our earlier interpretation of this noise as arising from the motion of clusters of ions.

Dielectric Breakdown of Polymers Under Prolonged Stress. ***Carl G. Brodhun.*** The life of electrical insulation subjected to continuous electrical stress depends on the magnitude of the stress. Plots of electrical stress *vs* time to rupture resemble mechanical endurance curves. When corona is present, its effects are superposed on the effects caused by the dielectric stress and thus causes an inflection on the endurance curve. It is shown experimentally that breakdown because of corona attack is progressive, and apparently universal for solid dielectrics. Polymeric materials studied included "Alathon" polythene resin, "Teflon" tetrafluoroethylene resin. Other insulating materials included mica and glass. The endurance curves for all materials investigated leveled

off only with the disappearance of corona. When corona is prevented, e.g., by excluding gases from the test region, the endurance curve is essentially flat in less than one hour. A theory to explain this behavior is proposed.

A number of other interesting papers were presented at the meeting other than those abstracted above. Titles of these papers, their authors and company connections follow:

Investigations on Plastics in a Large Range of Mechanical Frequencies, by W. Philippoff (Franklin Institute).

Dielectric Properties of Liquids, Gels and Solids at Audio Frequencies. II. Polyvinylchloride Plasticized by Di-2-Ethylhexylphthalate and Dimethylthianthrene, by R. F. Miller, E. R. Fitzgerald, J. M. Davies, and W. C. Sears (Goodrich).

Method for Determining Dynamic Mechanical Properties of Gels and Solids at Audiofrequencies; Comparison of Mechanical and Electrical Properties, by E. R. Fitzgerald and J. D. Ferry (University of Wisconsin).

Dynamic Mechanical and Electrical Properties of the System of Polyvinyl Chloride-Dimethyl Thianthrene, by J. D. Ferry and E. R. Fitzgerald (University of Wisconsin).

The Relaxation Distribution Function in Polyisobutylene and Polyisobutylene-Decalin Solutions, by L. D. Grandine, Jr., E. R. Fitzgerald, I. Jordan and J. D. Ferry (University of Wisconsin).

Ultrasonic Investigation of Plasticized Polymethyl Methacrylate, by R. G. Cheatham and A. G. H. Dietz, (M.I.T.).

Explicit Light Scattering Functions for Colloidal Solutions of Spheres, by W. Heller and W. J. Pangonis (Wayne University).

The Small Angle Scattering of X-Rays by Solutions of Macromolecules, by W. W. Beeman (University of Wisconsin).

Infra-Red Analysis of the Structure of High Polymers—Recent Developments, by G. B. B. M. Sutherland (University of Michigan).

Studies of Rapid Crystallization in Polymers, by W. H. Cobbs, Jr. and R. L. Burton, (DuPont).

Polymer Research as a Branch of Solid State Physics, by E. Guth (University of Notre Dame).

Structure of Solid Solutions, by R. Smoluchowski (Carnegie Institute of Technology).

Structure of Solids by Neutron Diffraction, by C. G. Shull, (Oak Ridge National Laboratory).

Structure and Mechanical Properties of Glasses, by W. A. Weyl (Pennsylvania State College).

The Viscosity of Concentrated Macromolecular Solutions, by R. Simha (New York University).

The Effect of Diluents on the Second Order Transition and Flow Properties of Polystyrene, by T. G. Fox (Rohm and Haas Company).

Random Noise in Dielectries, II, by H. Bauss and R. F. Boyer (Dow Chemical)

A Zirconium Concentrated-Arc Infrared Source for Infrared Spectroscopy, by M. B. Hall and R. G. Nester (DuPont).

Invisible X-Ray Padding

A physician at Mt. Sinai Hospital in New York City has developed a foam rubber pad which is used as cushioning on X-ray tables. The pad is itself covered with a foam rubber cover. Heretofore, X-ray tables have been uncovered and uncushioned, because wrinkles in the covers sometimes showed in the developed picture. The new mat, however, is invisible in X-ray photos.

Structure and Properties of Polyamides, by R. Brill (Polytechnic Institute of Brooklyn).

The Specific Heat and Degree of Crystallinity of Polychlorotrifluorethylene, by J. D. Hoffman (G-E).

Sedimentation and Diffusion of Polyelectrolytes, by B. Rosen and F. R. Eirich (Polytechnic Institute of Brooklyn).

Relations between Viscosity and Flow Birefringence of Polyelectrolytes, by P. M. Kamath, B. Rosen and F. R. Eirich (Polytechnic Institute of Brooklyn).

Polystyrene Molecular Weight Distribution by Turbidity Titration and the Effect on this Distribution of Variations in the Preparation of the Polymers, by A. F. Roche (Dow Chemical).

A New Molecular Weight Distribution Technique for Polystyrene, Part II, Experimental Results, by R. F. Boyer (Dow Chemical).

Configuration Distribution of a Chain Molecule with Correlations, by C. M. Tchen (National Bureau of Standards).

Bagley & Sewall Personnel Changes

T. Carter and E. Peterson of the Watertown, N. Y., office of the Bagley & Sewall Co., resigned from the company as of March 1, while J. Scheuermann of the New York office of the company resigned as of April 15. Effective April 1, the New York office at 500 Fifth Avenue was discontinued and all business pertaining to winders, paper machines and all other equipment manufactured by the company transferred to the home office at Watertown. The company states that in transferring these activities to the home office it will be in a better position to coordinate sales, engineering and manufacturing.

New Stock Cutting Laboratory

Taylor, Stiles & Co. have set up a completely equipped testing laboratory at their Riegelsville, N. J., plant to which anyone can bring or send samples for testing cutting to any specified dimensions or fineness. No charge is made for experimental cutting in this laboratory unless the volume amounts to a production quantity. Any charge is for actual cost of handling only.

Can't locate the office copy of RUBBER AGE when you need it? Use the coupon on page 131.

Fields Joins Ball Brothers

The Rubber Products Division of Ball Brothers Co., Inc., Muncie, Indiana has announced the appointment of A. B. Fields as the manager of the company's rubber plant in Muncie. Mr. Fields succeeded George P. Mitchel, who resigned recently. Mr. Fields joined the Muncie firm following a 20-year association with the Firestone Tire and Rubber Co., in Akron, Ohio, his native city, and at Noblesville, Indiana. He was chief development engineer for the Firestone Industrial Rubber Products Co. at Noblesville at the time he accepted the managership of Ball rubber products manufacturing. The new Ball factory manager was first associated with Firestone in Akron in 1933. He filled various production assignments there before the company transferred him, in 1937, to their Noblesville plant, an operation employing 2,200 rubber workers and whose manufacturing volume of around $50,000,000 a year consists largely of rubber products supplied the automotive industry. Mr. Mitchel, another former Firestone man, served as manager of the Ball rubber operation here from 1948 until he announced his resignation several days ago. He will continue to reside in Muncie for the time being.

Witco Stabilizer No. 80

Witco Chemical Co., New York, N. Y., has announced the development of Witco Stabilizer No. 80, a high-efficiency, liquid stabilizer for polyvinyl chloride resins. It contains 100% active ingredients consisting of barium and cadmium soaps in combination with a synergistic stabilizer. This type of stabilizing system has been found to contribute excellent stability against both heat and light degradation. By combining the three stabilizers into one fluid composition, the company states, the compounding of polyvinyl chloride formulations has been simplified considerably. Stabilizer No. 80 imparts good initial color and clarity to transparent sheets, is efficient under dynamic heat conditions, affords lubricity and release properties, and requires no pre-grinding for complete dispersion. It is especially recommended for plastisols and organosols.

New Life-Saver Tubeless Tire

B. F. Goodrich Co. has developed a new tubeless tire which is said to defy skidding on wet pavements, shortens stopping distances on ice as much as 30% and gives up to 15% added tire mileage. Called the "Life-Saver Tubeless Tire", it incorporates a new tread design consisting of more than 10,000 tiny blocks of rubber each only 625/10,000 of an inch wide and approximately ¼-inch deep. Engineers say the use of tread blocks of this minute size represents an entirely new approach to attaining the absolute maximum in tire traction. The new block design of the tread also gives quieter, smoother operation, Goodrich states, because the spacing of the tiny blocks raises the pitch of tire noise into a range too high to be audible to human ears. The tire is available in all popular low-pressure sizes.

1952 AMERICAN TOY FAIR SETS ALL-TIME REGISTRATION RECORD

An all-time registration record was established at the 49th American Toy Fair, held at the Hotels McAlpin and New Yorker in New York City from March 10 to 19. As usual, the Fair was held under the auspices of the Toy Manufacturers of the U.S.A., Inc., and special exhibits were held by manufacturers and distributors at the Fifth Avenue Building, at 1107 Broadway, and at other locations other than the two hotels mentioned above.

Although rubber toys and novelties were very much in evidence at the Fair, with several manufacturers introducing new items for the first time, it was also evident that the soft plastics and plastic inflatables were making deep inroads. Many of the so-called direct rubber toy manufacturers have introduced allied lines in the soft plastics. This is particularly the case where manufacturers of dolls and of soft, squeeze-type novelty characters are concerned.

All-plastic dolls were shown by several manufacturers, including the Sun Rubber Co., Ideal Toy Corp., Eugene Doll & Novelty Co., Natural Doll Co., Belle Doll & Toy Corp., Duchess Doll Corp., Horsman Dolls, Inc., Paris Doll Co., Terri Lee, Inc., Imperial Crown Toy Corp., Vogue Dolls, Inc., Nasco Doll, Inc., Roberta Doll Co., Inc., and others. Some of these also retained all-rubber latex dolls in their lines, but they were few and far between. All-rubber dolls, featuring new designs, were displayed by the Eastern Rubber Specialties Co. and the Sun Rubber Co.

Crib Toys and Specialties

Rubber latex crib toys and specialties were liberally displayed. Molded Latex Products, Inc., showed a new line of Kaysam Kuties, which feature movable heads and concealed voices, as well as its Pixie Elves, 10-inch dolls with harmless, washable bright colors. Blake-Cuttler Corp. displayed two new animated toys—Petey Pop-Up, which pops out of a barrel when squeezed, and Jo-Bo, which individually and all at once pops its eyes, nose and ears when squeezed. A new line of molded latex crib toys, in exceptionally attractive colors, was shown by the Aktoy Manufacturing Co. These included Tubby, Suzy, Jumby, Tony, Mimi, Rickey and Snooty.

Additional rubber squeeze toys were shown by the Oak Rubber Co., Eastern Rubber Specialties Co., Ellar Novelty Co., Seiberling Latex Products Co., Sun Rubber Co., and others. Oak Rubber featured its "SM" assortment, which includes four little "barnyard animals," completely made of rubber, including the whistle. Ellar Novelty's display included a 7-inch clown with a balloon attached to its mouth, the balloon being inflated when the clown's body is squeezed.

Among vinyl crib toys and specialties displayed were the following: a "Crib Clown" by Alan-Jay Plastics, Inc., which clamps onto the side of a crib; fish, walrus and frog novelties, all with whistles, by Eastern Rubber Specialties Co.; Sassy the Playful Horse, 6 inches high and 6 inches long, in assorted colors, which stays bent in any desired position, by Sidney-Williams Co., and Buck Bunny, the Ranger Rabbit, by the same company; fish, duck, turtle and alligator novelties, by F. W. Mitchell, Inc.; dogs, ducks, elephants and clowns, by Gerber Toys, Inc., and several others. A full line of vinyl hand puppets was shown by Zany Toys, Inc., and new Dean Martin-Jerry Lewis puppets by the National Mask and Puppet Corp. Alan-Jay Plastics also displayed "Bunny-Biter," a new teething ring made of polyethylene in the shape of a bunny.

Playballs and Beach Balls

The usual array of rubber playballs and beach balls was on display, featuring new designs and color arrangements. Molded Latex Products showed its all-rubber playball with automatic self-sealing valve, which is mouth inflated to 16 inches. Dewey and Almy Chemical Co. exhibited its line of Darex playballs, which feature fluorescent colors and inflate to 40 inches. Smaller, colorful playballs were shown by Eagle Rubber Co., Tillotson Rubber Co., Fli-Back Sales Corp., and Seiberling Latex Products Co. Eagle Rubber displayed a new, 5-color nursery ball to retail for 98 cents.

Numerous vinyl inflatable beach specialties were shown by such companies as Doughboy Industries, Inc., Clarvan Corp., Ideal Toy Corp., Plastikaire Products, Inc., Alvimar Manufacturing Co., Urb Plastics Corp., Plastictronics, Inc., and the Kestral Corp. Most of these concerns also displayed wading pools of all sizes, some of them ranging to 72-inch diameters. Inflatable comfort cushions, for the beach, picnics, and other applications were also displayed by some of these companies.

Toy balloons, in all lengths, colors, shapes and styles, on display cards and in various sets, were shown by various manufacturers, including Barr Rubber Products Co., Anderson Rubber Co., Marshall Rubber Co., Van Dam Rubber Co., and Tillotson Rubber Co. Most of these lines featured squawkers and noise-makers of one kind or another. Full-color balloons made with the Photo-Fidelity Process, printed on one side in a 6-inch circle print, were shown by the Lee-Tex Rubber Products Corp. of California. Designs currently available include an Indian, elephant and clown.

Rubber masks ranging from the beautiful to the grotesque, designed for adults, children and the small fry, were shown by Bayshore Industries, Inc., Topstone Rubber Products Co., and Lee-Tex Rubber Products, among others. The Bayshore line included several kinds of noisemaker rubber masks.

Staples Continue in Popularity

The staple rubber toys, such as automobiles, tractors, fire engines and animal characters featured by the Auburn Rubber Corporation, continue in popularity. The Auburn line exhibited at the Fair included new designs and improved color and decoration. Several new sets for the coming season were displayed by the company. A rubber brick building set, containing 160 bricks in various shapes, is a new Auburn Rubber item this year.

Rubber footballs, basketballs and baseballs, which have been gaining steadily in sales, were displayed by several manufacturers, among them being Barr Rubber Products Co., Seamless Rubber Co., J. A. Dubow Sporting Goods Corp., Trio Manufacturing Co., and Seiberling Latex Products Co. Eagle Rubber displayed a new trick baseball which bounces off center, retailing at 25 cents, in addition to its regular rubber football line.

Among new rubber novelties displayed at the Fair for the first time were the following: an all-rubber cowboy saddle for bicycles up to 24-inch size, shown by Topstone Rubber Products Co.; a low-priced all-purpose rubber swimming mask, displayed by Superior Rubber Industries; a Howdy-Doody 14-inch novelty made of latex foam sponge rubber, exhibited by Ben-Her Industries, Inc.; a 13-inch monkey made of latex foam sponge rubber, shown by National Playthings, and "Silly Putty," the so-called real solid liquid which can be shaped, stretched, pulled and otherwise manhandled, now being marketed by the Silly Putty Marketing Co.

Still other exhibits seen at the Fair included a new, unbreakable rubber latex dollskin, guaranteed against breaking and cracking, shown by the Dewey and Almy Chemical Co.; a low-cost recoil pad with sponge rubber insert, also by Dewey and Almy; a new rubber horseshoe set, displayed by Superior Rubber Products, and the new line of "RubberGuard" housekeeping aids, recently developed by the Seiberling Latex Products Co. The latter includes drainboard mats, kneeling pads, brushes, bath tub mats, toilet top trays, and stove top mats. New lines of cloth-lined rubber gloves and specially-sized rubbers for children were included in the exhibit of the Eastern Rubber Specialties Co.

ASTM 50th Anniversary Meeting

The 50th Anniversary Meeting of the American Society for Testing Materials will be held in New York City during the week of June 23. The meeting will be held at the Hotels Statler and New Yorker. The meeting will feature the Tenth Exhibit of Testing Apparatus and Laboratory Supplies as well as a photographic exhibit. Of particular interest at the meeting will be a Symposium on Recent Developments in the Evaluation of Natural Rubber, which will be held by Committee D-11 on Rubber and Rubberlike Materials. Committee D-11 will itself be celebrating its 40th Anniversary Meeting.

Columbian Carbon Co., New York, N. Y., has released another in its series of technical reports on Columbian Colloidal Carbons. Vol. X, No. 1 is entitled, "Carbon Gel as Revealed by the Electron Microscope."

Stockholders of the Worthington Pump and Machinery Corp. at their recent annual meeting voted to change the company name to the Worthington Corp. No company policies or practices will be affected in any way by the name change.

DAYTON'S FOREIGN ACTIVITIES BRING SATISFACTORY RETURNS

The Foreign Technical Service Division of the Dayton Rubber Co. was conceived just about 20 years ago. In March, 1932, at the very depth of the depression, A. L. Freedlander, president of the company, realized that he would not be able to keep his experienced technical staff together unless he found some special remunerative work to keep its members busy. The answer was the start of the company's special foreign service division, which is now headed by Ralph Reel and which is an active, integral part of Dayton Rubber.

Specialists of Dayton's Foreign Technical Service Division now operate in six foreign countries and have never lost a contract. In every case, the division has aided new, locally organized companies to gain a production foothold in their native lands. Unlike most other American firms which operate abroad, Dayton has no investment in any of these companies, its services, paid for in American dollars, being either on a flat fee basis or on a percentage of sales.

In its relationships with these foreign companies, Dayton does not permit its trade-mark to be used, its executives do not serve on management boards, nor does it interfere with merchandising activities. Instead, Dayton's job involves: (1) Helping the companies set up their own production; (2) Serving as a buying information office, rather than as a purchasing agent; (3) Bringing foreign technical people into the Dayton plant to teach them modern methods first hand; (4) Sending its own technologists abroad to improve local production methods; (5) Furnishing continuous service, trouble shooting and information on latest developments.

Firms Dayton Has Aided

Dayton's first customer for its technical advisory service was Askim Gummivarefabrik, located near Oslo, Norway, which was then making bicycle tires, boots and shoes, and miscellaneous molded goods. Dayton helped put the company into the tire business, and under its supervision production has reached 600 tires a day, 40% of these being truck tires. Its second contract was with Cia Brasileria de Artefactos de Borracha of Rio de Janeiro, Brazil. This company is Brazil's only 100% locally-owned tire manufacturer, and Dayton provided the skill, know-how and services which enabled the company to substantially increase its volume.

Roulunde Fabriker, Odense, Denmark, manufacturers of rubber belting since the 18th century, was Dayton's third customer. This firm was aided in completely modernizing its belting operations to the point where it is now the most modern V-belt manufacturer in the Scandinavian area. Production of transmission and conveyor belts was also increased, without the addition of any new equipment. Number four was the N. V. Veereenigde Nederlandsche Rubberfabricken, near Arnheim, Holland. Originally a manufacturer of bicycle tires, boots and shoes, and miscellaneous molded goods, it had a rather old-fashioned V-belt plant. Expanding and modernizing with Dayton's help, it now has what is said to be the largest belt division in Holland.

Still another Dayton contract is with the Regie Nationale des Usines Renault, the French automobile manufacturer whose plant is near Paris. This company makes tires for its own use on the Renault cars, and has increased production from 1200 to 2000 tires per day as a result of its contract with the Dayton firm.

The latest Dayton contract is with the Alliance Tire & Rubber Co., Ltd., of Israel. Dayton has signed a 10-year contract to design and give technical aid to this company under a unique arrangement between a group of American investors and the General Federation of Labor in Israel (Histadrut). In this enterprise, Dayton, for the first time, is receiving its compensation in stock. Alliance is building a 120,000 square foot plant, located at Hadera, with plans calling for an output of between 300 and 500 tires per day.

Details of the Contracts

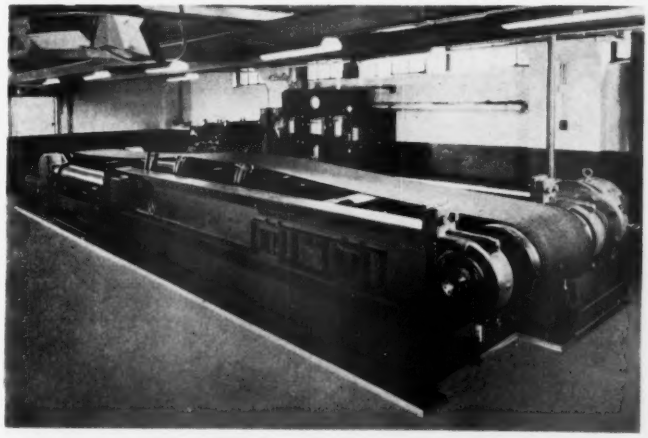
Dayton's contracts run a fixed term of 5 to 10 years. The company feels that any lesser period makes it impossible to develop the increased skills which make the operation worthwhile, in addition to which the initial presentation of knowledge, background and information is so extensive that it takes some time to put it into operation.

In most countries, the exchange situation has not presented any special problems. All contracts made by Dayton are recognized by the local governments. As a rule, Dayton also clears its contracts with the U. S. State Department which, while it never officially gives its approval, can indicate its disapproval. Dayton, incidentally, has never had to ask government help in obtaining payments under any of its contracts.

In the operation of its Foreign Technical Service Division, Dayton has frequently gone beyond mere engineering assistance. In many countries, for example, workers cannot earn much above their subsistence rate because of heavy taxes and local limitations. The incentive motive which often moves American workers simply does not exist in some instances. In such cases, Dayton representatives often try to help develop ways whereby workers who produce more gain more, and in this manner help sell the American free enterprise system.

According to Mr. Freedlander, Dayton Rubber is well satisfied with the results of its foreign technical operations, both on the basis of its monetary value to the company and American good will generated through the foreign contacts. As Mr. Freedlander puts it: "It has proved that a dollar invested in Europe, the Middle East and Southwest Asia particularly, is worth infinitely more than $100 in military aid."

RAYBESTOS-MANHATTAN INSTALLS NEW CONVEYOR BELT TEST MACHINE



What is said to be the world's largest laboratory conveyor belt testing machine is now in operation at the laboratory of Raybestos-Manhattan, Inc., Passaic, N. J. The unit was designed by company engineers and differs from laboratory test models in that it takes production-scale belts up to 30 inches wide to include widths in general use. This laboratory machine puts any 30-inch wide and 80-foot length of conveyor belt through its paces up to 200,000 pounds total tension. Duplicating actual conveyor equipment arrangement of head, snub, bend, takeup, and tail pulleys, with adjustable angle and elevation of troughing idler pulleys, automatic recorders trace simultaneously, power input, stretch, tension and speed at any speed up to 2,000 fpm. Factual recorded observations on this machine show the effect of pulley size, actual strength and factors of safety of a conveyor belt running over pulleys with any predetermined amount of tension load and overload. Elastic and permanent stretch are accurately measured through the cycle of minimum, average and maximum belt tension. The relation between troughability, load sag between idlers, thickness of belt and tension, is also shown by the unit.

ASTM COMMITTEE D-11 REPORTS ON RECENT COMMITTEE WEEK MEETING

Plans for a Symposium on Recent Developments in the Evaluation of Natural Rubber were completed by ASTM Committee D-11 during its three-day meetings held in Cleveland during ASTM Committee Week on March 3-7. The symposium will be held at the Fiftieth Anniversary Meeting of ASTM, June 23-27, in New York City. At that time Committee D-11 will also celebrate its Fortieth Anniversary. The symposium will comprise about eight technical papers, one of which will deal with the technically classified rubbers.

Committee D-11 reported approval of new Specifications for Rubber Insulating Gloves. These are an extensive revision of the former ASTM Standard D 120 (American Standard ASA J 6.6-1942). They cover three classes of gloves used for protection of workers on energized conductors and equipment. The gloves differ in wall thickness and have proof test voltages applied for 3 min.; of 10,000, 15,000, and 20,000 corresponding to Classes I, II, and III, respectively.

Action has been started to incorporate requirements for industrial gaskets in the Specifications for Non-metallic Gasket Materials (ASTM D 1170; SAE R 90). This would include a high-sulfur GR-S sheet material, widely employed in oil refinery service.

The Emergency Alternate Provision for Friction Tape (D 69) and Rubber Insulating Tape (D 119) are to be withdrawn but the requirements for number of pinholes is to be included in the specifications. New Specifications for Ozone-Resistant Tape will be submitted for publication as tentative after some further study. Also under consideration is a sampling procedure for tape on a statistical basis.

An important accomplishment concerns extensive revisions of the Methods of Sample Preparation (D 15-50 T). The revised methods are to be in three parts: Part A, for compounding and mixing standard compounds utilizing standard ingredients; Part B, samples for tension testing from mixing batches of rubber compounds; Part C, test specimens from a rubber sample which is not necessarily a test slab. The methods give standard formulas and instructions for mixing the rubber compounds. Detailed directions are included for crude natural rubber, neoprene compounds, GR-S compounds, GR-I compounds, and nitrile rubber stocks.

There was received a report on the chemical composition and physical properties of the technically classified rubbers. Plans are being made for round-robin tests on the quantitative determination of dirt in crude natural rubber.

The proposed Tentative Method of Test for Low-Temperature Compression Set of Vulcanized Elastomers was submitted. The effect of forced vibration on the hardness test of rubber will be studied. Plans were made to undertake further work on stress-relaxation tests.

At the meeting, Mr. Larsen of Lord Manufacturing Co. presented a paper describing the details of a low-capacity stripping method for rubber to metal adhesion for laboratory prepared specimens. It was decided to publicize this method.

Committee D-11 has approved a new Test for Adhesives for Brake Lining and other Friction Materials. The methods are for testing the new type of brake lining adhesive being used today on automobiles. Two procedures are covered: (1) evaluating the strength and permanence of bonds, and (2) measuring the shelf life of bonding cements, tapes, and adhesive film on coated brake linings. Decision was made to develop additional methods of test for brake adhesives; specifically, (a) measurement of under-cured bonds, (b) restudy of angular shear, (c) restudy of impact test, and (d) development of a fatigue test.

In the work on Coated Fabrics it was reported that new methods are under consideration for the following: cold test, plasticizer loss, dry cleaning, air and vapor permeability, and flame or fire test. A revision of the Method of Measuring Low-Temperature Stiffening of Rubber by the Gehman Torsional Apparatus (D 1053) will incorporate a method for the torsional constant of the wire used.

Work has continued at the National Bureau of Standards on developing a source of standard natural rubber; tests have indicated a good within-bale and between-bale uniformity for the lots of rubber investigated.

Airplane Tire Cost Data

According to Pan American World Airways, it costs between 85c to $3.50 in rubber every time one of its DC-4-type Clippers lands. The distance an airliner rolls on the ground is only a fraction of the length of its travels, averaging about 2½ miles per flight. It is the touchdown in landing that does most of the tire damage—the impact of 50 to 70 tons hitting the ground at 100 miles an hour. Tire maintenance at Pan American is an important branch of ground operations. The Clipper fleet wears out more than 3,000 tires a year. The Convair-type Clipper needs a tire change every 300 landings—giving a ground mileage of only about 750 miles. Constellation and DC-4 Clippers get about 385 landings per tire. Clipper tires are retreaded an average of twice before being scrapped. Tires for the Clipper fleet are said to cost from $75 to $315 each wholesale.

A copper bus bar weighing 14 ounces is being encased in a ¼-inch thickness of molded rubber-phenolic compound, manufactured by the Chemical Division of the General Electric Co., for insulation in the handling of household currents. Three sizes are being molded for Murray Manufacturing Corp. of Brooklyn, N. Y., by the Plastics Molding Corp., Sandy Hook, Conn.

RUBBER DEVELOPMENT PUSHED BY LATIN AMERICAN COUNTRIES

Close to $1,000,000 a year in U. S. public funds are being spent on the development of a natural rubber supply in the countries of South and Central America, according to a report submitted to the House Foreign Affairs Committee by its Inter-American Study Mission. Less than a third of the monies needed are coming from the United States, however, the rest being supplied by the nations in which the experimental work is being done. Six Latin American countries are in the rubber phase of the aid programs, and the report offered this breakdown on expenses:

	U. S. Cost	Local Contribution
Haiti	$44,644	$80,000
Dominican Republic	2,741	82,000
Colombia	27,000	153,000
Peru	17,291	326,000
Panama	500	
Mexico	131,200	131,200
Totals	$223,376	$772,700

The report was not optimistic about the success of the biggest program in Mexico where the U. S. has maintained a small rubber mission since 1941. The word from Colombia, however, was better. Two Agriculture Department experts are there working with the Colombian government. Work is in progress on the selection of outstanding hevea and other types of rubber which promise to be of practical value in the breeding of higher-yield and disease-resistant plants for hemisphere plantations.

Peru has a number of experimental rubber plantations going in its Amazon River region. The U. S. and a Peruvian corporation are in charge of this project. Though rubber yields have been small, a great deal of information has been collected on the growing of rubber under adverse circumstances.

In Haiti, emphasis is on the development of basic, over-all agricultural methods rather than on a single program, such as rubber. Some of the nation's best land, however, has been planted in cryptostegia.

While not mentioned in the report, Brazil too has been making an effort to increase its rubber production. According to a recent executive order signed by President Vargas, large makers of rubber goods must plow back 20% of their profits into rubber tree growing. The law prohibits manufacturers to buy locally or import raw rubber if they do not comply within one year. Rubber manufacturers may comply with the order by: (1) establishing their own rubber plantations or investing in others; (2) by granting credits to rubber planters.

The order said the practice will be observed while the Brazilian raw rubber output is not sufficient to cover the nation's industrial needs. The order was suggested to President Vargas by Agriculture Minister Joao Cleofas, who informed the President that consumption so far outstripped Brazilian production of natural rubber that the nation had to import 9,500 tons in 1951 plus 170,000 tires.

Cabot Carbon Vulcan 6 Black

Godfrey L. Cabot, Inc., Boston, Mass., has announced the development of Vulcan 6, a new superior grade of rubber reinforcing oil furnace black that is said to give 15-25% increased tire mileage over that provided by standard HAF grades. The black's greatly increased reinforcing ability has been proved in extensive Cabot road tests. The fact that Vulcan 6 can be substituted directly in HAF formulations will be significant in its general acceptance by the trade. Vulcan 6 properties recommend it for use wherever high tensile and high abrasion resistance are of primary importance. Rubber manufacturers can now obtain superior reinforcement that far exceed that provided by the HAF blacks without having to make major changes in HAF formulations. Vulcan 6 marks a new step forward in the development of highly reinforcing oil furnace blacks. The introduction of HAF blacks to the rubber industry resulted in the production of rubber tires and other products that were of higher quality than those made with the conventional channel blacks. Vulcan 6 now makes it possible to extend even further the service life of carbon reinforced rubber products. An oil-furnace black, Vulcan 6 results from the initiation ten years ago of a Cabot program to meet threatened gas shortages and rising natural gas prices. The Cabot oil furnace black range has been broadened to include Sterling V, General Purpose Furnace black; Sterling SO, Fast Extruding Furnace black; Vulcan 3, High Abrasion Furnace black; and Vulcan 6, better-than-HAF reinforcing black.

General Tire Opens Exhibit

General Tire & Rubber Co., Akron, Ohio, opened a new exhibit on April 3 at the Hotel Statler in Washington, D. C., which tells the story of the company—what it makes, and how it operates. The 2,400 square-foot exhibit features a series of 17 displays and more than 100 natural color photographs. General Tire's extensive research organization is emphasized, as well as its leadership in the construction of rockets and jet-assisted take-off units. The company is also concerned with chemicals, metal fabrication, radio and television, and is deeply involved in defense production in addition to its primary business of making a complete line of tires, tubes, mechanical and athletic rubber goods.

Furnace Black Quotas Lifted

Quota restrictions on exports of furnace black have been abandoned, effective April 1, the Office of International Trade announced recently. Explaining that until further notice exports of carbon black will be licensed on an open-end basis, OIT said that the relaxation has been made possible by an improvement in the supply situation. OIT said it would continue to control exports of carbon black for national security reasons and to assure a sufficient margin of the domestic supplies to meet any sudden rise in requirements for U. S. military or civilian tire production.

Joins Engineering Firm

H. Walter Grote

H. Walter Grote, widely known in both domestic and foreign rubber manufacturing circles, has become associated with the firm of Brown & Blauvelt, Consulting Engineers, 46 Cedar St., New York 5, N. Y. The firm offers complete engineering services and construction supervision for industrial plants, petrochemical plants, oil refineries, power stations, etc. Dr. Grote has had considerable experience in the rubber field, including affiliations with the Murray Rubber Co., U. S. Rubber Co., United Carbon Co., Wilmington Chemical Corp., and the Phillips Petroleum Co. He served as director of export sales for the Philblack Division of the latter company for several years, and later acted as a consultant for the company in Europe. For the past three years he has been operating as a chemical engineering consultant in Europe. He returned to the United States a few months ago.

American Hard Rubber Stock Plan

American Hard Rubber Co., New York, plans to help finance its expansion program by selling additional shares of common stock to shareholders. The company has registered 90,655 shares of $12.50 par common stock with the Securities and Exchange Commission. It plans to offer the stock to common and preferred shareholders at the rate of one new share for each four shares of preferred held, and one new share for each two shares of common held. Blair, Rollins and Co., Inc., is named as the principal underwriter. At present market prices, the sale would have a gross value of roughly $3,400,000. About $700,000 of the proceeds would be used in the concern's $15 million improvement program. The balance would be added to working capital.

Revised information about a series of resin emulsions containing 40 to 45% solids is available in a new leaflet from the Hercules Powder Co. The leaflet is entitled "Dresinol."

Plan Colloid Chemistry Program

A special program in the Colloid Chemistry of Elastic High Polymers in Science and Industry will be held at the Massachusetts Institute of Technology from June 16 to July 5. The course is planned to present to those actively engaged in the production and applications of natural and synthetic elastomers the latest information on the chemical composition, structure, and production of elastic high molecular colloids of organic and inorganic composition. The program will include explanation of the elasticity of these compounds on the basis of most recent developments and detailed discussion of their most important industrial applications and of their production on an industrial scale. The course will be conducted by Dr. Ernst A. Hauser, professor of chemical engineering at M. I. T. Requests for application forms or for further information should be addressed to Dr. Ernest H. Huntress, Director of the Summer Session, Room 3-107, Massachusetts Institute of Technology, Cambridge 39, Mass.

To Purchase Wheelco Instruments

Barber-Colman Co. of Rockford, Ill., will purchase the principal assets of the Wheelco Instruments Co., Chicago, Ill., Wheelco products consist of indicating, recording, and controlling industrial instruments, and combustion safeguards. Present plans are to continue operations in Chicago until such time as manufacturing facilities can be gradually transferred to Rockford. No changes are contemplated in Wheelco's national sales and service organization. Barber-Colman entered the automatic control field in 1926, and is now recognized as one of the leaders in the industry.

Goodyear Double Eagle Tire

A tire designed to give as much as 42% more non-skid mileage than the standard tire of today and a new safety tube giving complete protection against both punctures and blowouts have been announced by the Goodyear Tire & Rubber Co. Called the "Double Eagle", the new tire has all-nylon cords with sidewalls of natural rubber and tread of "cold rubber". An improved "Lifeguard" safety tube is said to provide complete protection against punctures as well as blowouts. Both the tube and the puncture sealant compound used are made of synthetic rubber.

Seiberling Cuts Tire Production

Seiberling Rubber Co. has cut work schedules on tires and tubes to a five-day-week because dealers have curtailed purchases, a company official revealed on April 1. H. P. Schrank, vice president of the company, said the production cut will continue until business picks up again. Seiberling Rubber previously had been operating on a six day work week. The company built up heavy inventories over the last two months by maintaining a six-day work schedule and now has been forced to reduce production until demand increases, he explained.

J. M. Huber Profit-Sharing Plan

J. M. Huber Corporation, New York, N. Y., paid to its employees over $1,100,000 under its profit sharing and retirement plans out of its 1951 earnings, Hans W. Huber, president, announced in his recent annual report. Huber plants are located in Brooklyn, N. Y.; Bayonne, N. J.; Chicago; St. Louis; Borger, Texas; Langley and Graniteville, S. C.; Huber, Ga.; and Havre de Grace, Md. The company has purchased a plant at Havre de Grace, Maryland, which will begin operations in May, 1952, to produce rubber pigments and rubber chemicals. Mr. Huber also said that the company drilled 58 new oil and gas wells during 1951. The company owns and operates 484 producing oil and gas wells in Texas, Kansas, Colorado, and Wyoming. During 1951 both units of the company's new furnace black plant began operation at Eldon, Texas, on the Gulf Coast. The plant has an annual capacity of 76,000,000 pounds of HAF-type carbon black. The company is also an important factor in the mining and refining of kaolin clay in South Carolina and Georgia. Kaolin or china clay is used in the rubber, paper and ceramic industries and for insecticide purposes in agriculture.

Naugatuck Chemical Appointments

Appointment of three new technical sales representatives for the latex and dispersions sales department of the Naugatuck Chemical Division, United States Rubber Company, was recently announced. D. Leete Keefer has been transferred from Naugatuck, Conn., to Philadelphia, Pa., as technical representative for the Philadelphia area. He replaces Gerald L. Dennis who has been sent to Los Angeles as branch manager. William J. Curtin, formerly assistant to the sales manager, was appointed technical representative in the Naugatuck area, replacing Mr. Keefer. He will make his headquarters in the division's main offices in Naugatuck, Conn. Succeeding Mr. Curtin as assistant to the sales manager will be Lawrence H. Bruce, formerly a process engineer in the Naugatuck Chemical plant.

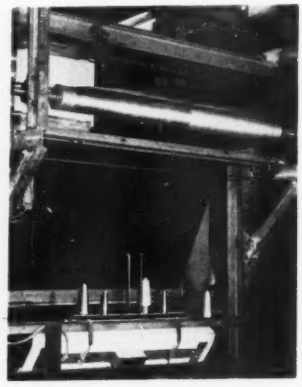
Kenrich Expansion Program

Kenrich Corp. has announced that the initial phase of its plant expansion program has been completed. Productive capacity has been increased substantially and provision has been made for further rapid expansion in the production of Kenflex resins. The increase in capacity, according to company officials, will enable the firm to meet the requirements of its present customers as well as potential customers. It was also announced that, in order to better coordinate its varied activities, the company's general offices have been moved from 120 Wall St., New York 5, N. Y., to 57-02 48th St., Maspeth 78, N. Y., where office space in its Laurel Hill plant will be occupied.

An index to Volume 70 of RUBBER AGE will be found on Pages 139 to 142 of this issue.

Installs G-E Beta Ray Gage

The problem of proper quality-control checks on fast moving sheets of rubber-coated tire fabric is said to have been solved at the Armstrong Rubber Manufacturing Co. of Des Moines, Iowa. There, as the impregnated strip of rubberized cord races from the calender rolls at the rate of thousands of yards a day, it is continuously and automatically monitored



The G-E beta ray gage (upper left) is shown in action as it continuously and automatically monitors fast-moving strip of rubberized cord as it moves through the calender rolls at Armstrong Rubber.

by a General Electric beta ray gage. This sensitive, non-contacting device scans the moving sheets with beta rays emitted from a tiny source of Strontium 90, a by-product of the atomic furnaces at Oak Ridge, Tenn. The amount of rays absorbed by the fabric gives an accurate indication of the material's weight per unit area. A deviation indicator on the instrument allows the calender operator to maintain easily the rubberized fabric at proper gage. It was pointed out that the beta ray gage has greatly improved Armstrong's roll-to-roll quality by delivering a uniform weight and gage in each roll. The beta ray gage has also eliminated the large amounts of waste inherent in the old system of quality control.

General Tire Plans Brazil Plant

Plans to build a $5,000,000 tire factory in Brazil which will be capable of producing 200,000 tires and tubes a year have been announced by William O'Neil, president of the General Tire & Rubber Co., upon his recent return from Rio de Janeiro. Mr. O'Neil said the plant would be capitalized according to the company's policy of financing foreign operations with local capital. Site of the new factory will be about 20 miles from Rio de Janeiro on a new highway to Sao Paulo. Construction will begin immediately with production slated to get underway in about a year. In addition, plans also call for the construction of a large and modern residential area for employees.

Plan New Vinyl Film Section

Manufacturers of vinyl film have been invited by the Plastic Coatings & Film Association, New York, N. Y., to join a new section devoted exclusively to the interests of producers of material under 10 mils. The invitation to form the new section was voted unanimously by the association at its March 12 meeting to provide a vigorous, coordinated program in the interest of film producers, product manufacturers, retailers and consumers. The Plastic Coatings & Film Association, which has been in existence since 1927, now represents manufacturers of pyroxylin coated fabrics, vinyl coated materials and vinyl sheeting in the 10 mil and over category. To assure a homogeneous industry group, membership in the proposed Film Section would be open only to manufacturers of vinyl film under 10 mils. Membership in the section, however, would include membership in the association as a whole. The section would hold separate meetings to deal with its special problems and would appoint its own committees to work with the association staff in the furtherance of its program.

Names Three General Managers

Minnesota Mining & Manufacturing Co., St. Paul, Minn., has announced the appointment of three general managers to head tape divisions of the company. C. C. Smith, associated with the company since 1928, has been named general manager of the Cellophane Tape Division. William E. Zimmerman, a member of the firm since 1938, has been appointed general manager of the Industrial Tapes Division. Bernard W. Lueck, with the company since 1935, has been named general manager of the Masking Tapes Division. The company's other tape unit, the Electrical and Sound Recording Tape Division, will continue to be headed by Robert L. Westbee.

Goodyear Expanding Georgia Plant

Goodyear Tire & Rubber Co. has awarded a contract for the design and construction of a large air-conditioned, windowless manufacturing building at its Cartersville, Ga., plant. Construction of the new 299 by 280-foot structure is to get underway immediately and is scheduled for completion by August 1. It is understood that the building will cost approximately $750,000 and when equipped will represent a multi-million dollar investment. The new facilities will permit Goodyear to expand its tire fabric production.

Plymouth Rubber Increases Sales

Plymouth Rubber Co., Canton, Mass., is experiencing a recovery in business following a slump in sales which developed in the second half of its fiscal year ended November 30, 1951, said Joseph M. Hamilburg, president, after the recent annual meeting. The outlook, he added, is "very encouraging." He said the company has over $1,000,000 of government orders. Inventories have been reduced substantially and are now at a more workable level and in line with current market prices, said Mr. Hamilburg.

ACS TRENTON SECTION HEARS TALK ON OIL-EXTENDED RUBBERS

Rapid strides of the nation's synthetic rubber industry in the development and production of an improved quality, lower cost rubber for tires was reflected at a meeting of the Trenton Section of the American Chemical Society, on March 11. Dr. James D. D'Ianni, a research executive of The Goodyear Tire & Rubber Company, told the Trenton Section that in exactly one year and one day (March 11) from the time his company first went into production on a new oil-extended synthetic, (25 parts of a special processing oil are added to 100 parts of butadiene-styrene) a 50% increase in the amount of extending oil used has been found possible without any impairment of quality.

In other words, 37.5 parts of oil now can be added to a masterbatch of 100 parts of conventional synthetic latex. Dr. D'Ianni said that further studies are being made at Goodyear with the objective of utilizing the maximum amount of oil without sacrifice of quality. Price can well be affected, he said, because 137.5 pounds of this rubber can be produced for the same price of 100 pounds of conventional "cold" rubber, plus the low cost of the extending oil, he explained.

This oil-masterbatch process, developed in Goodyear's laboratory under the sponsorship of the Synthetic Rubber Division of the Reconstruction Finance Corporation, Dr. D'Ianni said, went into commercial production at Houston March 10 of last year. Since that time five other government-owned plants, operated by private industry, have employed this process. They are Copolymer Corp. at Baton Rouge, La.; General Tire at Baytown, Texas; Phillips Petroleum at Borger, Texas; Goodrich at Port Neches, Texas; and Midland Rubber at Torrance, Calif. The industry is now producing oil-extended rubber, Dr. D'Ianni reported, at the rate of over 10 million pounds per month. This output, he said, can be increased with only slight plant modifications necessary.

Discussing the 37.5 oil process, Dr. D'Ianni said that tire tread tests conducted by Goodyear and the government have conclusively demonstrated that these oil-masterbatched rubbers exhibit tread wear equal, if not superior to those made with standard cold or natural rubber. The heat build-up of these "internally lubricated" polymers, he reported, is substantially less than that of cold rubber, and this feature undoubtedly will be of advantage in carcass stocks for heavy duty truck tires.

So. Ohio Group Hears Livingston

The March 20th meeting of the Southern Ohio Rubber Group, held at the Y.M.-C.A. in Dayton, Ohio, featured an address by Dr. L. F. Livingston, manager of the Extension Division, Public Relations Department, E. I. du Pont de Nemours & Co., Inc. About 100 members and guests were present for the meeting. Dr. Livingston presented an educational program and display pointing out chemical achievements produced in DuPont laboratories.

Celebrating 50th Anniversary

Eric Bonwitt

April, 1952 marks the 50th anniversary of service to the rubber industry by Eric Bonwitt, head of the firm bearing his name in Chicago, Ill. Mr. Bonwitt is a dealer in new and used machinery for the rubber and plastics industries. He began his business career in 1902 in the city of Hanover, Germany, where he formed his own business. This business continued in operation until 1938, when Mr. Bonwitt came to the United States. Soon after his arrival in Akron, Ohio, he established his own business. After World War II, he moved his offices to Chicago, from which address he presently operates.

N. Y. Holds Spring Meeting

Approximately 250 members and guests attended the Spring Meeting of the New York Rubber Group, held on April 4 at the Henry Hudson Hotel in New York City. The meeting featured the presentation of two interesting papers, followed by dinner and entertainment. C. A. Litzler, president, Industrial Ovens, Inc., Cleveland, Ohio, gave a talk on "Surface Coating and Impregnation of Flexible Web Fabric," in which, by means of numerous slides and running comment, he traced the development of coating and impregnation equipment, and outlined some of the more difficult problems which have since been successfully solved. E. V. Osberg, assistant manager, Chemical Division, General Tire & Rubber Co., Akron, Ohio, gave a talk on "Polygen—A New Class of Synthetic Rubber." This talk, similar to those Mr. Osberg has been presenting before various local rubber groups for the past few months, stressed the numerous advantages offered by the high Mooney synthetic polymers. After dinner, entertainment was furnished by Dr. Jaks, psychologist, lecturer and mentalist.

Plans Passaic Plant Addition

U. S. Rubber Co. has announced plans to add 60,000 square feet of manufacturing space to its plant at Passaic, N. J. for the manufacture of rubber hose for the armed forces. Construction will start immediately and is expected to be finished in approximately six months. The new facilities will provide employment for an estimated 125 persons.

BOSTON RUBBER GROUP HEARS TALKS BY SIBLEY AND DOBSON

The Boston Rubber Group held its Spring Meeting on March 21 at the Hotel Somerset in Boston, Mass., with some 330 members and guests in attendance. Dr. R. L. Sibley of the Rubber Service Department, Monsanto Chemical Co., Nitro, West Va., addressed the group on "The Story of a Rubber Chemical," while John G. Dobson, manager of the Chemical Industries Division of the Foxboro Co., spoke on "Control Instruments in a Rubber Factory."

In his address Dr. Sibley noted that a great volume of study and work is involved usually over a long period of time in developing a specialty rubber chemical to commercial adoption. The findings of a research laboratory are always many months and all too frequently several years ahead of actual production activities. This usually is due to the high cost and non-availability in commercial quantities of the required raw material. Because of this, research, having found a suitable product, effective for the end uses desired, must divert its attention from the end product, to the raw materials required therefor, and develop processes to produce the raw material and then to prove by development studies on larger scale operation that the process is soundly chosen. Then the desired rubber chemical in its turn must be studied and its own manufacture proved feasible and commercially practicable.

With these points determined, samples then may be distributed for customer evaluation and during this test period commercial size units for the manufacture of the product and any necessary raw material can be installed. Such procedure was described in some detail for an accelerator, an antioxidant and an ultra accelerator with compounding test data shown to demonstrate the reasons for selecting the products actually chosen.

Mr. Dobson explained the principles of automatic control and how they apply to instruments designed for governing temperature, pressure and time cycles.

Quebec Group Hears Lockwood

The Quebec Rubber and Plastics Group held their March dinner and meeting at the Queen's Hotel in Montreal on March 20th with Warren S. Lockwood as guest speaker. Mr. Lockwood is associated with the Natural Rubber Bureau, Washington, D. C., in the capacity of director. Mr. Lockwood first outlined the present day conditions regarding production of natural rubber in Southeast Asia. Beginning with the arrival at one of the rubber ports, he then gave a thorough picture of visits through the various rubber plantations. The habits and general living conditions of the population in this area were also discussed, as well as the difficulties which have arisen through present world conditions. After the talk, a technicolor film on "Southeast Asia" was shown to the group outlining in further detail various points of Mr. Lockwood's discussion. Approximately 65 members and guests were present for the dinner with about 90 being present for the talk and film.

ONTARIO HEARS DROGIN TALK ON COMPOUNDING RESEARCH METHODS

The March 11th meeting of the Ontario Rubber Section of the Chemical Institute of Canada, held at the Hart House in Toronto, Ont., Canada, was addressed by Dr. I. Drogin, director of research for the United Carbon Co. Dr. Drogin spoke on "Methods Employed in Compounding Research." The speaker stated that compounding research is no longer an art but a science wherein compounds are appraised on the basis of systematically organized facts. Among the approaches to compounding research, he said, are:

(1) Strategic planning of experiments so that maximum data from minimum amount of work can be obtained with a known degree of precision; (2) Applying statistical methods to the control of physical testing of rubber; (3) Resorting to improvements in test equipment and techniques to establish small differences in rubber; (4) Using National Bureau of Standards compounding material for reference purposes; (5) Taking a practical attitude toward new material and its appraisal; (6) Having a clearer understanding of technical terms; (7) Formulating to suppress or to develop differences in compounds; and (8) Benefiting from an exchange of technical information.

Elaborating on improvements in test equipment, Dr. Drogin made reference to the stress-strain machine, the Inertialess Weighing System, the Firestone Mod-u-meter, and improvements in viscosity measurements and in humidity and temperature control.

Compounding Research Types

Dr. Drogin stated that types of research connected with compounding may be the following: fundamental, for determining the basic nature of polymers; technological, for evaluating the practical possibilities of rubber; and factory, dealing with factory processing and fabrication, compounding ingredients, quality considerations, costs, etc.

The compounding research problems which faced rubber technologists in the past are relatively insignificant when compared with the problems which have arisen in the utilization of 176 commercial grades of natural, synthetic and reclaimed rubber and more than 1,300 compounding ingredients listed in the rubber trade journals, Dr. Drogin said. To utilize efficiently any compounding ingredients, the technologist should be familiar with its fundamental properties and characteristics from many angles, he declared.

The practical aspects of compounding research were discussed at length in connection with tire treads, mechanical rubber goods, belts, hose, wire and cable insulation, and heels and soles. Emphasis was placed on the choice of polymers, compounding ingredients, processing factors, cure, physicals, performance in the laboratory and in service compliance with specifications, cost considerations, etc.

Dr. Drogin stated that compounders and their co-workers deserve great tribute for the magnificent gains made in the rubber industry during the past decade. It is due to the efforts and perseverance of these men that rubber in this country has become one of the leading industries of our time, he concluded.

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Coming Events in the Rubber Industry

Apr. 25. Detroit Rubber and Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Apr. 30-May 1-2. Rubber Division, A.C.S., Spring Meeting, Netherlands Plaza Hotel, Cincinnati, Ohio.

May 2. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

May 6. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Calif.

May 8. No. California Rubber Group, Elks Club, Berkeley, Calif.

May 9. Connecticut Rubber Group, United Illuminating Co. Auditorium, New Haven, Conn.

May 13. Ontario Rubber Section, C.I.C., General Brock Hotel, Niagara Falls, Ont., Canada.

May 16. Buffalo Rubber Group, International Meeting, Hotel Brock, Niagara Falls, N. Y.

June 5. No. California Rubber Group, Elks Club, Berkeley, Calif.

June 7-8. Los Angeles Rubber Group, Outing, Hotel Del Mar, Del Mar, Calif.

June 7. So. Ohio Rubber Group, Inland Activities Center, Dayton, Ohio.

June 12. New York Rubber Group, Outing, Doerr's Grove, Millburn, N. J.

June 13. Boston Rubber Group, Outing, United Shoe Country Club, Beverly, Mass.

June 20. Akron Rubber Group, Outing.

June 20. Boston Rubber Group, Summer Outing, Andover Country Club, Andover, Mass.

June 23-27. A.S.T.M. Fiftieth Anniversary Meeting, Hotels Statler and New Yorker, New York, N. Y.

June 26. Rhode Island Rubber Club, Outing, Metacomet Golf Club, East Providence, R. I.

June 27. Detroit Rubber and Plastics Group, Outing, Forest Lake Country Club, Pontiac, Mich.

June 27. Washington Rubber Group, Summer Outing, Annapolis Roads Club, Annapolis, Md.

July 22. Buffalo Rubber Group, Outing, Transit Valley Country Club, Buffalo, N. Y.

Aug. 5. New York Rubber Group, Golf Tournament, Baltusrol Golf Club, Springfield, N. J.

Sept. 4. No. California Rubber Group, Elks Club, Berkeley, Calif.

Sept. 8-11. A.S.M.E., Fall Meeting, Chicago, Ill.

Sept. 9. Connecticut Rubber Group, Outing.

Sept. 11. So. Ohio Rubber Group, Engineers Club, Dayton, Ohio.

Sept. 14-19. A.C.S., Annual Meeting, Atlantic City, N. J.

Sept. 25. Ft. Wayne Rubber and Plastics Group, Hotel Van Orman, Ft. Wayne, Ind.

Oct. 3. Detroit Rubber and Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Oct. 7. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Calif.

Oct. 9. No. California Rubber Group, Elks Club, Berkeley, Calif.

Oct. 17. Boston Rubber Group, Hotel Somerset, Boston, Mass.

Oct. 24. New York Rubber Group, Henry Hudson Hotel, New York, N. Y.

Oct. 29-31. Rubber Division, A.C.S., Fall Meeting, Hotel Statler, Buffalo, N. Y.

Nov. 6. No. California Rubber Group, Elks Club, Berkeley, Calif.

Nov. 11. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Calif.

Nov. 14. Connecticut Rubber Group, Fall Meeting.

Dec. 4. Ft. Wayne Rubber and Plastics Group, Hotel Van Orman, Ft. Wayne Ind.

Dec. 12. Boston Rubber Group, Hotel Somerset, Boston, Mass.

Dec. 12. Detroit Rubber and Plastics Group, Christmas Party, Detroit-Leland Hotel, Detroit, Mich.

Dec. 12. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 13. So. Ohio Rubber Group, Miami Valley Golf Club, Dayton, Ohio.

Dec. 16. Buffalo Rubber Group, Xmas Party.

Quebec Holds Annual Dance

Approximately 260 members and guests of the Quebec Rubber and Plastics Group attended the annual dance held on February 29th in Victoria Hall, Westmount, Quebec, Canada. The feature of the evening was a drawing for many valuable gifts. Refreshments were served during the intermission.

THIOKOL CLUB HEARS WINKELMANN ON AGING OF RUBBER COMPOUNDS

Approximately 125 members and guests of the Thiokol Club attended the March 19th meeting held at the laboratories of the Thiokol Corp. in Trenton, N. J. Principal speaker of the meeting was Dr. H. A. Winkelmann, research director of the Dryden Rubber Division, Sheller Manufacturing Corp. Dr. Winkelmann spoke on "Weather Aging of Rubber Compounds".

In his address, Dr. Winkelmann noted that good weather aging of automotive rubber assemblies is dependent upon the control of certain variables, such as selection of polymer, dispersion, processing, compounding ingredients, method of molding, curing without strain and lubricants. The method of exposure testing developed by the SAE-ASTM Technical Committee on Automotive Rubber (Tentative D51T) provides a uniform method of preparation and handling of samples and provides a means of correlating exposure tests between laboratories.

The author stated that since cracking of rubber is due to ozone, it is hoped that an accelerated test for determining the resistance of a rubber compound to ozone can be worked out in the laboratory. An ozone chamber test does not take into consideration the effect of sunlight, temperature changes and water. An accelerated ozone test should be based on compounds whose weather aging resistance is known in various geographical locations.

No appreciable difference in weather aging resistance has been observed in 15 different samples of hot and cold GR-S in an extruded compound exposed in Illinois, Michigan, Massachusetts, Florida and California. An oil-extended GR-S did not give as good resistance to cracking as standard hot or cold polymers, he said. While GR-S is preferred to natural rubber in weather aging compounds, it is interesting to note that extruded and molded compounds of both GR-S and natural rubber varying in hardness from 40 to 80 give an SAE-ASTM rating of 1 after 500 to 700 days outdoor exposure.

Dr. Winkelmann reported that in August, 1951, poor dispersion was observed in a commercial weatherstrip. A rating of 3 was observed in Chicago in 7 days whereas a sample from the same strip gave a rating of 1 after 30 days exposure in Clearwater, Fla. This simply means that good weather aging may be obtained when the ozone concentration is low even though poor dispersion is indicated.

Exposure tests on daily production of a given compound in various geographical locations often show variations in weather aging due to changes in dispersion, processing and cure. Since premature cracking is observed quickly such tests are a rapid and reliable production control. Of course, the speaker observed, a day to day variation in ozone concentration in a given locality must be considered.

Impellers for General Electric dishwashers are now being molded of a rubber-phenolic compound manufactured by the company's Chemical Division.

Named Assistant Vice-President

Garvin A. Drew

Garvin A. Drew, general sales manager of A. Schrader's Son Division of the Scovill Manufacturing Co., Brooklyn, N. Y., has been appointed assistant vice-president of the parent company with respect to the affairs of the Schrader division. He will continue in his capacity of general sales manager. Mr. Drew was graduated from the Massachusetts Institute of Technology in 1925 with a B. S. degree. He received his master's degree in business administration from New York University in 1928. While at M. I. T., Mr. Drew was active in athletics, being National Intercollegiate Champion in the hammer throw in 1924. Mr. Drew joined the Schrader organization in 1925. Following his initial work in the Manufacturing Department at the plant in Brooklyn, he became salesman in the Detroit area, and then moved to various posts throughout the United States until he was appointed Pacific Coast manager in 1935. After serving in the latter capacity for nearly five years, he was recalled to Brooklyn to assume the position of general sales manager in December, 1939. Mr. Drew has been active in rubber group activities, and in 1939 served as president of the Los Angeles Rubber Group. Mr. Drew has also been active in sales management circles, being president of the New York Sales Managers' Club in 1950. For several years, Mr. Drew has been a lecturer at New York University and the College of the City of New York.

No. Calif. Holds Panel Discussion

The March 6th meeting of the Northern California Rubber Group held at the Elks Club in Berkeley, Calif., was devoted to a panel discussion on "Compounding, Processing and Fabrication in the Rubber Industry." The discussion was led by Joseph Hollister of the Mare Island Naval Shipyard Rubber Laboratory. Chief topics discussed were variations in bank and batch temperatures during mixing, and the effect of these variations in temperature on subsequent storage and physical tests. Also discussed by the panel were problems of the adhesion of rubber to metal.

STIEHLER ADDRESSES WASHINGTON ON RUBBER RESEARCH IN EUROPE

Approximately 75 members and guests of the Washington Rubber Group attended the meeting held on March 19 in the Auditorium of the PEPCO Building, Washington, D. C. Principal speaker of the evening was Dr. Robert D. Stiehler, Chief, Testing and Specifications Section, National Bureau of Standards, Washington, D. C. Dr. Stiehler spoke on "Rubber Research in Western Europe."

As leader of the U. S. delegation to Technical Committee 45 on Rubber of the International Organization for Standardization, which met in Oxford, England, last October, Dr. Stiehler had the opportunity of observing first hand the research activities in rubber in the British Rubber Producers' Research Association, Rubber-Stichting, and the Institut Francais du Caoutchouc, technical groups sponsored by the International Rubber Research Board.

He described the work being done to improve the specific properties of natural rubber. Some of the more promising projects were: (1) Production of an oil-resistant rubber by heating the latex with acrylonitrile and a catalyst; (2) The reinforcement of natural rubber by means of synthetic resins in order to get increased strength and resistance to tear; (3) The use of mica or aluminum powder flakes in natural rubber inner-tubes to decrease their permeability to air. Inner-tubes containing these materials are better for air retention than regular natural rubber inner-tubes but not as good as butyl rubber inner-tubes; (4) The use of positively-charged latex for treating wood; (5) Cyclization of natural rubber latex; and (6) Preparation of a high quality rubber of uniform plasticity and rate of cure.

In addition to the above work, Dr. Stiehler mentioned the production of tires by Michelin and Continental, where wire cords are used instead of textile cords. Michelin in France is producing both passenger and truck tires using wire cords.

Dr. Stiehler next discussed the production of synthetic rubber in Europe. He had observed that all the factories visited were using some synthetic rubber imported from Sarnia in Canada. West-Germany has resumed production of some Buna-3 and Buna-N as well as a new synthetic rubber called "Vulcollan". This latter product is chemically not a diolefin rubber, but rather a polyester-amide. Its properties are excellent, with the exception of its behavior at low temperatures.

An added feature of the meeting was the showing of the 16mm color and sound film, "The Story of Carbon black". This film, loaned by the Godfrey L. Cabot, Inc., showed the production, control, packaging, and testing of carbon black.

Building New Field Wire Plant

Rex Corp. of Cambridge, Mass., is presently constructing a new plant at Acton, Mass., for the manufacture of infantry field wire for the U. S. Army Signal Corps. It is reported that the plant will have more than 30,000 square feet of floor space. Wire insulation will be a combination of nylon and polyethylene.

U. S. Rubber Student Aid Plan

A new five-year program of financial aid to science students in 11 leading universities was announced today by United States Rubber Co. The new program will provide graduate fellowships in science for 11 students at an approximate cost of $174,000. The stipend for each fellow will be $2,600 a year if single, and $3,300 if married, including in each instance $1,200 to the university for tuition and fees. The universities which have accepted the fellowships are: California Institute of Technology, Pasadena, Calif.; Cornell University, Ithaca, N. Y.; Harvard University, Cambridge, Mass.; University of Illinois, Chicago, Ill.; Massachusetts Institute of Technology, Cambridge, Mass.; Northwestern University, Evanston, Ill.; University of California, Berkeley, Calif.; University of California at Los Angeles, Calif.; University of Chicago, Chicago, Ill.; University of Minnesota, Minneapolis, Minn.; University of Wisconsin, Madison, Wisc.

The company established its first fellowships at 10 universities in 1947. The stipend for each fellow during the last five years has been $2,200 if single and $2,800 if married. In addition to the five-year program at the 11 universities, the company has renewed for one year a $1,500 fellowship in physics at the University of Virginia and one in polymer physics at the University of Notre Dame, the stipend for the latter being $1,200 if single and $1,800 if married, plus $1,000 for tuition and fees. The fellows will be selected by the universities in accordance with their established practices and will not be restricted in the choice of position after the expiration of their fellowship.

URW to Seek Pay Increases

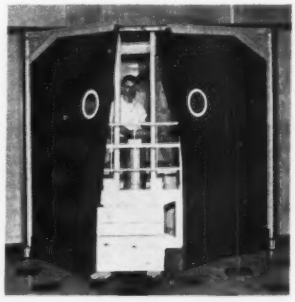
The 200-member Policy Committee of the United Rubber Workers, C.I.O., meeting in Cleveland, Ohio, on March 17 and 18, decided to ask industry for an "equitable" but unspecified pay rise for the union's 200,000 members in 33 states and 2 Canadian provinces. The Policy Committee also decided that 1952 contracts should increase the $100-a-month pensions won two years ago. Last year the rubber workers settled for a basic hourly pay raise of 13c. This year, they want "an equitable wage increase to preserve and improve living standards and to give workers a share in rising productivity of the rubber and allied industries," the committee's resolution said.

Fidelity Names Sales Agent

Fidelity Machine Co., Inc., Philadelphia, Penna., has named H. M. Royal, Inc., of 4814 Loma Vista Ave., Los Angeles, Calif., as the exclusive representative of Fidelity equipment for the wire and rubber industries. H. M. Royal, Inc., will handle the sale of Fidelity vertical hose reinforcement machines, Fidelity automatic rubber measuring and cutting machines and Fidelity automatic electronic rubber take-up reel stands in the State of California.

Candor Flexible Rubber Door

Candor Engineering Co., 4 Wachung Place, Summit, N. J., has developed a new industrial door which is quickly adaptable to special operating needs. The main member of the door is a 3/16-inch curtain of rubber reinforced with two layers of cotton duck. The curtain is suspended in a steel frame of inverted "L" shape in which it is firmly secured at the top and the hinged side. The frame is constructed of



welded tubing. A double acting spring mechanism, which is concealed in the vertical tube, returns the frame to its closed position after it has been opened. The spring tension is controlled by a worm gear and worm, and can be regulated from the outside with a screwdriver. The Candor door is pushed open by electric or hand trucks, the rubber curtain absorbing the shock. Proper vision is obtained by small round Plexiglas windows. When resistance to oil and grease is desired, neoprene curtains are furnished. The steel frames are supplied with a primer coat of paint. The door is available in 7 by 7 and 8 by 8-feet sizes, with other sizes made to specifications.

Goodyear Chemical Appointments

Goodyear Tire & Rubber Co. has announced three new appointments to its Chemical Division. William H. Abernethy, special representative for Goodyear in Atlanta, Ga., since July, 1949, has been named district manager in the division's new district office there. John E. Warner, special representative in the division's Chicago district office since May 1950, has been transferred to the St. Louis office. H. Charles Brennan, who joined the organization in October, 1951, has been assigned as special representative of the division in New York City. Mr. Abernethy joined the company as a squadron trainee in 1942. After working elsewhere from 1946 to 1949, he returned to Goodyear as a Birmingham sales representative. Mr. Warner was in the Navy from 1943 to 1946 and was a graduate of Kent State University. He joined the squadron in 1948. Before going with Goodyear last October, he was a major in the Chemical warfare service.

An index to Volume 70 of RUBBER AGE will be found on Pages 139 to 142 of this issue.

Joins Connecticut Hard Rubber

Dr. Warren Stubblebine, formerly research director for the Chemicals and Plastics Branch of the Research and Development Division, Office of the Quartermaster General, has joined the Connecticut Hard Rubber Co., New Haven, Conn., as director of development. Born in Reading, Penna., on January 18, 1917, Dr. Stubblebine received his B. S. degree in chemical engineering from Pennsylvania State College in 1938. In 1940 he received his M. S. from the same university and in 1942 he received his doctorate, also from Pennsylvania State. From 1942 to 1947, he was associated with the Armstrong Cork Co., Lancaster, Penna., as head of the Plastics Section of the Research Laboratories. From 1947 to 1952, Dr. Stubblebine was associated with OQ-MG. He has served as the Army member on the Committee on Equipment and Materials of the Research and Development Board. Dr. Stubblebine is a member of the American Chemical Society, the Chemical Engineers Club of Washington, and served as president of the Washington Rubber Group for the 1950-51 season.

.001-Inch Vinyl Film Process

A process which makes possible the manufacture of a tough, transparent vinyl plastic film in thicknesses of one-thousandth of an inch or less has been announced by the Naugatuck Chemical Division, U. S. Rubber Co. The process is expected to open up extensive markets for vinyl film in industrial and consumer packaging. It also makes possible large volume sales of vinyl film directly to the consumer in roll form for household uses. The process utilizes a method known as "blow extrusion" where the film, which is based on Marvinol VR-10 resin, is extruded through a circular die at temperatures between 375° and 425° F. The film can be produced in widths exceeding 100 inches and in thicknesses of as little as three ten-thousandths of an inch. At this thickness, it is possible to obtain 50 square yards of film from one pound of raw material. Since the film is produced in tubular shape, the company also foresees a large volume of sales in the form of rolls of tubular film directly to individual consumers for uses around the home.

Detroit Schedules April Meeting

The Detroit Rubber and Plastics Group will hold its Spring dinner meeting on April 25th at the Detroit-Leland Hotel, Detroit, Michigan. E. W. Tillitson, program chairman, assisted by J. B. Ledden has arranged a "Panel Discussion on Cellular Rubber and Plastic Products" for this meeting. Dr. H. A. Winkelmann, Research Director, Dryden Rubber Division of Sheller Mfg. Corp., will act as moderator. The panel will include R. N. Kennedy, Dow Chemical Co., who will talk on Styrofoam, C. L. Collins, Bakelite Corp., who will discuss vinyl sponge and phenolic blown sponges, and Messrs. E. Svendsen, U. S. Rubber Co., R. Harper, Rubatex Co., and G. Sprague, Sponge Rubber Products Co., who will review rubber blown products.

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AIEE to Hold One-Day Meeting

The Subcommittee on Rubber and Plastics Industries of the Committee on General Industry Applications, American Institute of Electrical Engineers, will hold a one-day conference on Electrical Engineering Problems in the Rubber and Plastics Industries at the Portage Hotel in Akron, Ohio on April 28. A number of interesting papers have been scheduled for presentation at the conference, including:

"Z Calender Control," by J. C. Hall, Goodyear Tire & Rubber Co., Akron, Ohio.

"Adjustable vs. Constant Potential D-C Systems for Rubber and Plastics Plants," by I. E. Andreasen, General Electric Co., Schenectady, N. Y.

"Magnetic Amplifier Control for Rubber and Plastics Machines," by A. W. Harrington, Louis Allis Co., Milwaukee, Wisc.

"Mercury Arc Rectifiers for D-C Plant Power in Rubber Plants," by N. A. Williams, Goodyear Tire & Rubber Co., Akron, Ohio.

"Ignitron Rectifiers for D-C Plant Power," by P. A. Gustafson, U. S. Rubber Co., 1230 Avenue of the Americas, New York, N. Y., and E. L. Smith, Firestone Tire & Rubber Co., Akron, Ohio.

"Electronic Control of Rubber Machinery," by B. G. Wheeler, Cutler-Hammer, Inc., Milwaukee, Wisc.

"Beta Ray Gauges Applied to Calenders," by George Foster, Industrial Nucleonics Corp., Columbus, Ohio.

Increases Flexible Hose Output

In a move to meet the increased demand for flexible automotive hose, the W. J. Voit Rubber Corp., Los Angeles, Calif., has engineered and installed a new production line and plant capable of manufacturing twice the present output. Voit Rubber began production of the flexible, heat-resistant and non-collapsible hose early in 1951 and featured a kit of only 18 assorted hose sizes that provided complete coverage for passenger car radiator hose replacements. Previously 164 pieces of old style hose had been required. The new production line, which went into full-scale operation recently, is housed in a plant next to the site of the company's No. 1 factory at 1600 East 25th St., Los Angeles. Previously, the hose had been manufactured at Voit Rubber's No. 2 plant, 4010 Whiteside St., Los Angeles.

Fazakerley to Visit U.S.

T. W. Fazakerley, for many years associated with the P. B. Cow group of companies in England as general manager and director, and now managing director of Educational & Scientific Plastics, Ltd., of Croydon, Surrey, England, is expected to arrive in the United States for a stay of several months. Mr. Fazakerley expects to appoint sales agents for his company's osteological models and demonstration units for medical and educational purposes, and to discuss the further use and application of rubber and plastics in the production of models for medical and educational training with such organizations as U.N.E.S.C.O. and U.N.I.C.E.F.

WASHINGTON APPOINTMENTS

J. Ernest Miller, on leave from the B. F. Goodrich Chemical Co., has been named assistant to the chief of the Synthetic Rubber Division, Reconstruction Finance Corp.

Fred W. Fraley, vice-president in charge of sales for the Diamond Alkali Co. and Dr. George E. Holbrook, assistant director of the Development Department of E. I. du Pont de Nemours & Co., Inc., have been named deputy directors of the Chemical Division, NPA.

Frederic Arden, formerly assistant director of the Chemical Division, NPA, has returned to his post with the Mathieson Chemical Corp.

George K. Casto, formerly deputy director of the Rubber Division, Emergency Procurement Service, General Services Administration, has been named director of the division.

Elected Technical Committee Head

Ralph T. LaPorte, chief chemist for the Seiberling Rubber Co., has been elected chairman of the Technical Advisory Committee of the Copolymer Corp. The Copolymer Corp., a company which operates the government-owned synthetic rubber and butadiene producing plants at Baton Rouge, La., is operated jointly by eight rubber companies, including Seiberling. Mr. La Porte succeeds J. H. Fielding, vice-president of the Armstrong Rubber Co., West Haven, Conn., who completed two years as chairman of the committee. Other members of the committee are R. E. Rude (Armstrong Rubber); Vaughn Wheeler (Armstrong Rubber); J. H. Fielding; Dr. J. P. McKenzie (Copolymer); Joseph Rockoff (Dayton Rubber); K. G. Custer (Gates Rubber); W. B. Dunlap (Lee Rubber); R. M. Gage (Mansfield Tire); and William Pyle (Sears, Roebuck). Col. C. M. Hulings is operating vice-president of the Copolymer Corp.

New Use of Latex Coating

Dow Chemical Co., Midland, Mich., has reported that it is now possible for paper mills with size press facilities to apply latex base clay coatings directly to paper. Through the use of Dow Latex 512-K, the company claims, manufacture of a new line of paper without modification of existing equipment or investment is permitted. The company stated that because of the thermoplastic nature of the product, super-calendering gives the sheet improved smoothness. Further, the company said, Dow Latex 512-K in a pigmented size press coated paper also contributes toward web run resistance. Paper coated at the size press with the latex adhesive opens market possibilities for a wide range of improved papers.

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Develops New Rubber Road Mix

Goodyear Tire & Rubber Co. has announced the development of an entirely new synthetic rubber powder for rubber roads. The new product is described as a finely-divided, free-flowing powder made by the co-precipitation of a butadiene-styrene latex and a mineral filler. It was developed in cooperation with the Berry Asphalt Co. of Magnolia, Ark., one of the nation's leading producers of asphalt road building materials. Goodyear officials explained that as a free-flowing powder, the new material is easy to handle. It mixes freely with asphalt. Several tons of the material have already been produced in Goodyear's pilot plant at Akron and a number of test installations have already been placed in the Middle West. The rubber can be made available in two forms, as a co-precipitate with some of the fine mineral aggregate normally used in bituminous concrete, or as a pre-mix with powdered asphalt. Tests on asphalt surfaces containing the new rubber show that from 1.5 to 2% added to the weight of the asphalt is equally effective as a 5% conventional rubber-asphalt mixture in resisting the stripping action of water and frost. The new rubber shows considerable promise too, Goodyear stated, as a filler in composition siding, shingles and the like.

Rebuilt Harwick Plant Opens

Ravaged by fire just about 11 months ago, the plant of the Harwick Standard Chemical Co. at Akron, Ohio, has now been rebuilt at a cost of $300,000. About 75% of the 100 by 250 foot brick structure which was damaged by the intense heat, had to be replaced. Since the fire, Harwick has taken over the entire 40,000 square foot building, increasing its floor space by more than 50%. Previously, another firm had leased a section of the plant. The plant was originally opened in the fall of 1948. Fire broke out in the center of the warehouse on May 1, 1951, destroying hundreds of tons of chemicals. Offices of the plant were ready for use again in a little over two weeks, while the section devoted to manufacturing was back in operation in three weeks. The rebuilding of the warehouse section, just completed, places the entire plant back in operation. To celebrate the re-opening, the firm held an "open house" on April 5.

To Sell Part of Rome Plant

General Cable Corp. has announced that part of its Rome, N. Y. plant is for sale. The company also said the firm is continuing to study the possibility of relocating its Bayonne, N. J., and Los Angeles plants in inland areas as part of its long range planning. A spokesman stated the study of the Bayonne and Los Angeles situation is in line with the Government's recommendations for dispersion of vital defense production centers. "It is a general study," he added, "and nothing concrete has been determined." The two plants are not for sale. The company said the Rome plant's excess facilities have been for sale for some time. They have a combined total of 1,200,000 square feet.

NAMES IN THE NEWS

ALBERT E. WILLMS, sales engineer with Whittaker, Clark & Daniels, Inc., is recovering from his recent operation and will soon return to his New Jersey, Pennsylvania territory.

NOEL S. WORRELL, associated with the American Zinc, Lead and Smelting Co. since 1920, has been elected vice-president in charge of traffic for the company. He will maintain his headquarters in St. Louis, Mo.

GORDON MCNEIL, formerly associated with the Goodyear Tire & Rubber Co., and since 1950 associated with the Standard Products Co., Cleveland, Ohio, has been named sales manager of the latter company's Mechanical Rubber Division at Port Clinton, Ohio.

ARTHUR A. ANDERSON, previously manager of the Torrance, Calif., plant of the Rome Cable Corp., has been elected a vice-president of the company.

WILLIAM H. ROBERTS, JR., associated with the Glyco Products Co., Brooklyn, N. Y., since 1947, has been elected vice-president in charge of operations for the company.

A. J. SCHNEIDER, formerly head of Midwest sales for the Dewey and Almy Chemical Co., has been appointed manager of the Shoe Products Division of the company.

ALEX J. PAGEL, president of Pagel, Horton & Co., Inc., has been elected president of the Swedish Chamber of Commerce of the U. S. A.

WILLIAM A. SCHNELL, for the past 40 years associated with the Link-Belt Co. as sales engineer, has joined the sales staff of the Consolidated Products Co., Inc., New York, N. Y.

T. T. MILLER has been elected vice-president in charge of marketing by the directors of the Dewey and Almy Chemical Co., while GEORGE W. BLACKWOOD has been elected vice-president and general sales manager of the company.

MISS JESSIE MAY SMITH, associated with the American Resinous Chemicals Corp. since 1944, has been named administrative assistant to the president.

JOHN L. CRAIG, associated with the Wyandotte Chemicals Corp. since 1949, has been appointed sales representative of the company's Cincinnati, Ohio, office.

COLLEY W. GILCHRIST, formerly assistant purchasing agent at the St. Marys, Ohio, plant of the Goodyear Tire & Rubber Co., has been named purchasing agent of the firm's plant in Luxembourg.

ELMER G. STILLWAGGON, after four years in the Export Department of Whittaker, Clark & Daniels, Inc., New York, N. Y., has been promoted to manager of the department succeeding LOUIS STORCH, who has been named import manager for the company.

WILLIAM I. BURT, vice-president in charge of manufacturing for the B. F. Goodrich Chemical Co., recently celebrated the completion of 25 years with his company and its parent firm, the B. F. Goodrich Co.

ALLEN LATHAM, JR., technical director of the Mechanical Division of Arthur D. Little, Inc., Cambridge, Mass., has been elected a vice-president of the company.

E. A. JOHNSON, formerly associated with the Chemical Division of the Borden Co., has been appointed district manager in the Resin Sales Section of the Barrett Division, Allied Chemical & Dye Corp.

ALEXANDER T. DAIGNAULT, treasurer of the Dewey & Almy Chemical Co. and BRADLEY DEWEY, JR., vice-president in charge of the Cryovac Division, have been elected to the board of directors of the company.

PAUL MAYFIELD, general manager of the Naval Stores Department, Hercules Powder Co., Wilmington, Del., has been elected to the board of directors of the company.

WILLIAM M. DOUGHERTY, secretary of the U. S. Rubber Co., has been elected secretary of the American Society of Corporate Secretaries, Inc.

GEORGE DAWSON, formerly assistant to the president of A. G. Spalding & Bros., Inc., Chicopee, Mass., has been named national sales manager of the company.

ROBERT J. NADALIN, formerly with the Barrett Division of the Allied Chemical & Dye Corp., is now associated with the Columbia-Southern Chemical Corp. at Barberton, Ohio.

BENJAMIN T. MOFFAT, formerly a vice-president of Hewitt-Robins Inc., New York, N. Y., has been elected executive vice-president of the company.

JOHN L. COLLYER, president of the B. F. Goodrich Co., has been named chairman of the American Business Division of the United States Olympic Association.

BAILEY BENNETT, formerly research associate in the Department of Agricultural Biochemistry of Ohio State University, has been appointed principal chemist in the Resin and Rubber Division, Battelle Memorial Institute.

HOWARD A. BELLOWS, formerly manager of retail merchandising for the General Tire & Rubber Co., has been elected a vice-president of the company.

HERBERT M. WENDLE, previously in the New York office of the Naval Stores Department of the Hercules Powder Co., has been named assistant director of sales for the department in charge of rosin and terpene chemicals.

GERALD L. DENNIS, associated with the Naugatuck Chemical Division, U. S. Rubber Co., since 1944, has been named branch manager of the West Coast operations of the division succeeding the late J. RAYMOND MORATH.

G. W. HULDRUM, JR., associated with the Shell Chemical Corp. since 1939, has been appointed sales manager of the Western Division of the company.

FOSTER DEE SNELL, president of Foster D. Snell, Inc., consulting chemists, will receive the Fourth Annual Honor Scroll Award of the New York Chapter of the American Institute of Chemists at a dinner meeting in New York City on May 22.

HARRY M. FRECKER, associated with the U. S. Rubber Co. for the past 30 years, has been named manager of commodity sales for the Mechanical Goods Division.

JOSEPH M. SCHMIDT, formerly sales manager of the Plastic Welding Corp., has joined the Rubber Specialties Division of the Dewey & Almy Chemical Co. to assist in sales of meteorological balloons and the division's new guaranteed unbreakable dollskin.

D. G. CALKINS, previously associated with the Battelle Memorial Institute, has been named to head the new Radiochemistry Department of the Industrial Nucleonics Corp., Columbus, Ohio.

SEWALL D. ANDREWS, previously director of sales for the Chemical Division of General Mills, Inc., Minneapolis, Minn., has been named general manager of the division. He will continue to head sales activities while assuming responsibility for all divisional activities.

HERBERT E. SMITH, former chairman of the board of the U. S. Rubber Co., and now a director and member of the Finance Committee of the company, has been named to the board of directors of the Carrier Corp., Syracuse, N. Y.

R. S. WILSON, vice-president of the Goodyear Tire & Rubber Co., has received a distinguished service award from the National Association of Soil Conservation Districts in recognition of his origin of the Goodyear Soil Conservation Awards program.

HERBERT R. SCHWARZ, associated with the Wellington Sears Co. since 1935, has been named to the newly-created position of director of research and fabric development for the company.

Imperial Re-Opens Akron Office

Imperial Commodities Corp., 70 Pine St., New York 5, N. Y., has established a new office in the Mayflower Hotel, Akron, Ohio, under the management of Frederick J. Horn, who will be assisted by David W. Thomas, presently on loan to the General Services Administration as rubber buyer. Mr. Horn has been associated with Imperial for the past 3 years. The Akron office will be equipped with a private line Teletypewriter service in order to provide faster communication between Akron and New York where similar service is maintained between Amsterdam and London. In addition to extensive natural rubber importing, Imperial serves as outlet in the Western Hemisphere for the production of N.V. Deli-Maatschappij, N. V. Deli-Batavia Maatschappij and N.V. Deli-Batavia Rubber Maatschappij's group of estates having an approximate annual production of 25,000 tons of high-grade crepes and sheets. In addition to offices in Amsterdam and London, the firm has offices in Medan, Djakarta and Singapore through subsidiary companies, one of which, Anglo-American Corp., Ltd., also maintains a packing plant.

De Vilbiss Atomizer Plant

Coincident with the appointment of two new vice-presidents for its paint spray machinery and atomizer divisions, the De Vilbiss Co. has announced that the company's new plant at Somerset, Penna., would be devoted exclusively to the manufacture of atomizers, perfume dispensers and medical vaporizers. Don E. Fenstermaker, newly appointed vice president and general manager of the Atomizer Division, will have charge of the plant. Henry M. Kidd has been named a vice-president and sales manager of the Paint Spray Machinery Division in Toledo.

General Tire Approves Stock Split

Stockholders of the General Tire & Rubber Co. have approved a proposal to split the common stock of the company two-for-one. They also agreed to reduce the par value of the stock from $5 to $2.50 a share and to increase the authorized common to 1,500,000 from 750,000 shares. Giving effect to the split, the number of shares outstanding will total 1,206,528. The company has disclosed that it now controls the Mutual Broadcasting System through ownership of 58% of that company's outstanding stock.

Synthetic Rubber Tested in Boots

The U. S. Army is testing synthetic rubber insulation for use in combat boots in place of wool, the Department of Defense has reported. The new insulation substitutes a unicellular synthetic rubber for the wool fleece and felt used in the uppers and in the soles of the boot. The Army hopes that the new insulation will make the boot more resistant to puncture. Tests have already proved that the new layer resists penetration by water, making it unnecessary to patch the boot immediately, the Army said.

Plaster-Concrete Bonding Unit

Buffalo Products, Inc., 315 Babcock St., Buffalo 10, N. Y., is now manufacturing a unique product called "Kif," which has been especially designed for bonding plaster permanently to concrete. Kifs are made from a special GR-S compound and are approximately 2 inches in

diameter. In application, the units are nailed at certain intervals on the concrete form boards. Then the concrete is poured. After the concrete has hardened, the removal of the forms pulls the elastic Kifs out of the concrete leaving clean, undercut niches. The "kiffed" unit is now ready for plastering. When the plaster is applied, it squeezes into the undercut niches and forms a permanent, latheless, mechanical bond between concrete and plaster. Kifs also find use in waterproofing concrete walls, in tunnel construction, as anchors for masonry, etc. The product may be re-used.

General Tire Israeli Plant

Israel's first tire company, constructed by the General Tire & Rubber Co., was scheduled to begin operations in mid-April. The plant was to employ 250 persons. The new factory building, constructed on the outskirts of Tel Aviv, is expected to turn out 500 tires daily. This should supply the Israeli market and even provide some export tires. Financed by mixed American and Israeli capital, General Tire & Rubber Co. (Israel) Ltd., is considered one of the most important manufacturing plants installed since Israel came into being. The Israeli government, which will take 50% of the company's profits in taxes, hopes some tires can be exported. Even so, company personnel believe it will be impossible to compete on the world market because of the high cost of most things in Israel.

Reports on Guayule Program

Officials of the Department of Agriculture in recent testimony before a House appropriations subcommittee, stated that the guayule rubber program is back in the post-war doldrums despite the impetus lent it by the Korean hostilities. The munitions Board originally turned over $500,000 to the Agriculture Department for guayule research. According to the testimony, all the government got for its money was 9,600 pounds of guayule seed. Technical advances in the field have been few. Agriculture Department experts said all but $54,377 has already been spent on the work. The Department is asking $225,300 with which to carry on technical experiments at Salinas, Calif., in the next fiscal year.

Improved Phthalocyanine Blues

Whittaker, Clark & Daniels, Inc., New York, N. Y., has announced three new phthalocyanine blues said to have superior characteristics and properties. The new blue are Aquamarine Blue No. 1670, Synthaline Blue No. 1950, and Synthaline Blue Flushed No. 1949. All were developed in the laboratories of Thomasset Colors Inc., for whom Whittaker, Clark & Daniels are exclusive distributors. Aquamarine Blue No. 1670 is a 20% blue in paste form. It is dispersed in water and contains a dispersing agent. Application tests indicate that the product is particularly suitable for latex emulsions, water paints, etc. It is said to be superior to previous types in compatibility, better color strength, dispersion, and it does not agglomerate in emulsions. Synthaline Blue No. 1950 is a dry phthalocyanine blue that is non-dusting and non-crystallizing. It can be used in the production of any product for which a non-crystallizing blue is desirable. Synthaline Blue Flushed No. 1949 is 20% blue, 40% long oil alkyd, 40% solvents. It has potential uses in the manufacture of paints and enamels.

Produces 550,000,000th Tire

Tire production reached another significant milestone and new record at the Goodyear Tire & Rubber Co. with completion of the firm's 550 millionth pneumatic tire for motor vehicles, announced recently. Weighing slightly more than 1,100 pounds and reaching almost seven feet in height the new milestone unit is the Goodyear All-Weather Earthmover, size 24.00-29, 24-ply. Despite its huge size, the tire is not the largest unit produced by Goodyear which also builds tires weighing almost as much as 2,000 pounds. Since Jan. 1, 1947, the company has manufactured approximately 150,000,000 motor vehicle tires.

Kralastic J Styrene Copolymer

Development of a new thermoplastic molding and extrusion compound which will retain its toughness and high impact strength at temperatures as low as —60° F. has been developed by the Naugatuck Chemical Division, U. S. Rubber Co. The new material, known as Kralastic J, is a styrene copolymer. Its initial uses are expected to be primarily military applications where a plastic with low temperature toughness is required. Possible applications include military equipment for Arctic use and for aircraft which reach low temperatures at high altitudes.

Robbins Vinyl Floor Mats

Robbins Tire & Rubber Co., Tuscumbia, Ala., is producing a line of "Shur Safe Lifetime Vinyl Floor Mats" designed for use in homes, offices, factories and as automotive replacement mats. The mats are not affected by greases, oils, or alcohol, and come in seven colors. The company states that the mats are highly resistant to sand, gravel and other abrasives. The mats are available in two sizes, 16 by 18 and 17 by 21 inches.

FINANCIAL NEWS

Seiberling Rubber Co.

For 1951: Net income of $1,216,574, which is equal to $3.30 a common share, compared with $1,815,560, or $5.26 a share in 1950, after a $500,000 reserve for inventory price decline had been deducted. No reserve was deducted in 1951. Net sales in 1951 totaled $43,681,425, 14% above the $38,321,118 in the previous year. The consolidated balance sheet as of December 31, 1951, showed total current assets of $15,283,882, and total current liabilities of $5,625,479. In the previous year, total current assets were $14,087,591, while total current liabilities were $4,639,281. Working capital increased $210,093 during 1951, totaling $9,658,403 at the year end.

Firestone Tire & Rubber Co.

Quarter Ended January 31: Net income of $9,317,550, which is equal to $2.35 per share of common stock after providing $2,603,000 for earnings of certain foreign subsidiaries which cannot now be remitted, compared with $10,272,869, or $2.60 per share, after allowing $3,300,000 for unremitted profit for the foreign subsidiaries. Sales for the first quarter of the 1952 fiscal year amounted to $224,064,005, against $211,042,771 in the same period of the preceding fiscal year.

St. Joseph Lead Co.

For 1951: Net income of $13,577,236, which is equal to $5.50 a share, compared with $12,211,614, or $4.94 a share, in the preceding year. Earnings in 1951 set a new record, the previous high having been in 1947 when the net totaled $12,537,760. Sales in 1951 also set a new record of $110,834,083, against $103,871,428 in 1950.

Mohawk Rubber Co.

For 1951: Net income of $1,072,313, which is equal to $7.57 a share on net sales of $20,884,078, compared with $596,096, or $4.21 a share on sales of $11,551,554 in 1950. As of December 31, 1951, the company reported total current assets of 6,843,031, and total current liabilities of $3,654,422.

Detroit Gasket & Mfg. Co.

For 1951: Net profit of $1,251,998, which is equal to $2.39 a share on net sales of $3,365,136, compared with $1,846,664, or $3.52 a share, on sales of $25,660,566 in 1950.

Gro-Cord Rubber Co.

For 1951: Net income of $32,111, which is equal to 29c a common share, compared with $147,722, or $1.35 a share, in the preceding year.

Minnesota Mining & Mfg. Co.

For 1951: Net income of $15,738,452, which is equal to $1.92 a share, compared with $20,318,904, or $2.51 a share in the preceding year. Sales in 1951 reached a peak of $170,067,527, an increase of 11% over the $152,806,313 for 1950. As of December 31, 1951, the company reported total current assets of $84,640,132, and total current liabilities of $36,178,349. At the end of the preceding year, total current assets were $87,043,584, while total current liabilities were $32,857,623.

Columbian Carbon Co.

For 1951: Net profit of $5,469,279, which is equal to $3.39 a share, compared with $6,149,161, or $3.81 a share, in the preceding year. Sales in 1951 reached a record $50,008,607, against the $48,680,481 reported in 1950. As of December 31, 1951, the company reported current assets of $21,462,062 and current liabilities of $7,221,888. At the end of the previous year, current assets were $22,322,655, while current liabilities were $6,804,588.

Farrel-Birmingham Co., Inc.

For 1951: Net income of $1,418,275, which is equal to $4.36 a common share on net sales of $25,498,754, compared with $1,346,717, or $4.21 a share, on sales of $17,227,344 in 1950. Working capital in 1951 increased to $9,210,933 from $7,563,042 in the previous year.

National Rubber Machinery Co.

For 1951: Net profit of $673,628, which is equal to $3.84 each on 176,000 shares, compared with $335,821, or $2.18 each on 154,000 shares in 1950. Net sales in 1951 increased to $12,016,027 from $5,196,587 in the preceding year.

Allen Industries, Inc.

For 1951: Net income of $1,007,326, which is equal to $1.80 each on 559,200 shares, compared with $1,488,547, or $2.60 a share. Sales in 1951 totaled $30,662,811, the second largest on record but 9.7% under the $33,973,817 volume for 1950.

O'Sullivan Rubber Corp.

For 1951: Net profit of $219,499, contrasted with $315,352 in the previous year. Net sales in 1951 amounted to $6,290,000 against $5,924,000 in 1950.

Canada Wire & Cable Co., Ltd.

For 1951: Net profit of $2,100,634, equal to $10.30 each on 201,526 Class B shares, compared with $1,932,108, or $10.06 each on 181,636 shares in 1950.

Intercontinental Rubber Co.

For 1951: Net income of the company and its subsidiaries totaled $473,625, against $73,678 in the preceding year. In 1951, sales of guayule rubber totaled $1,782,451, while in 1950, sales of guayule were $697,229. The comparative consolidated balance sheet as of December 31, 1951, showed current assets of $1,700,713, and current liabilities of $240,120. At the end of the previous year current assets were $1,385,574, while current liabilities were $28,275.

Raybestos-Manhattan, Inc.

For 1951: Net income of $4,857,140, which is equal to $7.73 per share of capital stock, contrasted with $4,868,769, or $7.75 a capital share, in 1950. Net sales in 1951 totaled $84,866,074, against $65,444,665 in the previous year. As of December 31, 1951, the company reported total current assets of $31,191,640 and total current liabilities of $10,930,033. At the end of the preceding year, total current assets were $27,984,368, while total current liabilities were $8,039,112.

Thiokol Corp.

For 1951: Net profit of $119,239, which is equal to 39c each on 306,000 capital shares, compared with $90,670 or 30c each on an equal number of shares in the preceding year. Net sales in 1951 totaled $4,841,627, against $2,522,382 in 1950.

Electric Auto-Lite Co.

For 1951: Net income of $11,162,093, which is equal to $7.47 a share, contrasted with $16,670,495, or $11.15 a share, in the previous year. Sales in 1951 reached a record high of $292,720,182, up $47,330,864 from the 1950 volume of $245,389,318.

Hewitt-Robins Inc.

For 1951: Net profit of $1,038,219, which is equal to $3.73 a share on net sales of $36,307,105, compared with $1,266,929, or $4.55 a share on sales of $23,451,792 in 1950.

Sheller Manufacturing Corp.

For 1951: Net profit of $2,935,830, which is equal to $2.65 a share on record net sales of $43,078,181, compared with $4,701,451, or $4.25 a share on sales of $42,066,449 in the preceding year.

Kerite Company

For 1951: Net income of $697,373, which is equal to $4.82 a common share, contrasted with $531,327, or $3.75 a share, in 1950.

American Hard Rubber Co.

For 1951: Net income of $725,546, which is equal to $6.91 a common share on net sales of $22,104,523, compared with $902,773, or $8.91 a share on sales of $17,255,959 in the previous year.

Case Symposium on Adhesion

The Case Institute of Technology, Cleveland, Ohio, will be the scene of a Symposium on Adhesion on April 24 and 25, 1952. A number of interesting papers have been scheduled for presentation at the symposium under the general headings of theory, testing and applications. The papers, their authors and business connections follow:

Theory

Survey of Adhesion and Types of Bonds Involved, by Frank W. Reinhart, National Bureau of Standards.

The Adhesion of Polymers to Cellulose —A Resume, by A. D. McLaren, College of Agriculture, University of California, Berkeley, Calif. (To be read by C. H. Hofrichter, Jr., Cellophane Division, Olin Industries, Inc.)

Properties of Thin, Unsupported Films, by H. P. Meissner, Department of Chemical Engineering, Massachusetts Institute of Technology.

The Adhesion of Elastomeric Pressure Sensitive Materials. Rate Processes, by Willard M. Bright, Theodore Clark Laboratory, The Kendall Co.

The Development of a Characteristic Constant for the Determination of the Adhesive Properties of High Polymers, by Otto F. Hecht, Harold W. Coles, and Margaret M. Keeler, Pioneering Research Laboratories, U. S. Army Quartermaster Corps.

Work of Adhesion at Solid-Solid Interfaces, by Harold M. Schollberg and Marshall R. Hatfield, Central Research Department, Minnesota Mining and Manufacturing Co.

On the Role of Polarization in The Adhesion Between Metals and Non-Metallic Substances, by W. A. Weyl, Department of Mineral Industries, Pennsylvania State College.

On The Theory of Adhesion, by Lt. Col. Stanley J. Czysak, Flight Research Laboratory, Wright Air Development Center.

Testing

Behavior of Adhesives in Strength Testing, by G. W. Koehn, Research and Development Center, Armstrong Cork Co.

Selecting Glass Adhesive by Strength Tests, by Frank Meser, Research Laboratories, Pittsburgh Plate Glass Co.

Nondestructive Testing of Adhesives by Ultrasound, by Albert G. H. Dietz, Department of Building, Engineering and Construction, Massachusetts Institute of Technology.

A Microcalerimeter for the Measurement of Energies of Immersion, by Philip E. Berghausen, Applied Science Research Laboratory, University of Cincinnati.

Energy of Adhesion, Molecular Force, and Adhesive Rupture, by Gerard Kraus, Applied Science, Research Laboratory, University of Cincinnati.

Comments on Relationships of Test Methods to Fundamental Aspects of Adhesion, by R. C. Platow, Murray Hill Laboratory, Bell Telephone Laboratories.

Applications

Types and Uses of Adhesives, by R. F. Blomquist, Forest Products Laboratory, U. S. Department of Agriculture.

Low-Temperature Curing Plastic-Metal Adhesives, by H. A. Perry, Jr., Naval Ordnance Laboratory.

Adhesives for Glass, by Luther L. Yaeger, Bjorksten Research Laboratories, Inc.

Adhesion of Organic Surface Coating, by Henry Grinsfelder, Research Laboratory, Rohm and Haas Co.

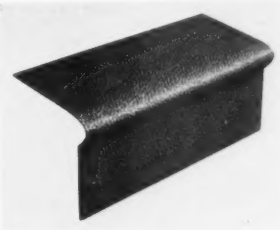
Pressure-Sensitive Adhesives and Tapes, by James E. Corbin, Tape Division, Minnesota Mining and Manufacturing Co.

Aircraft Structural Adhesives, by Major T. J. Martin, Materials Laboratory, Wright Air Development Center.

Air Force Elastomer Adhesion Problems, by 2nd Lt. I. H. Bernstein, Materials Laboratory, Wright Air Development Center.

Fremont Rubber Stair Treads

Fremont Rubber Co., Fremont, Ohio, has announced a new type of stair tread that will add more beauty to any stairway by actually simulating carpeting. The top surface of the new rubber stair tread has a pebble-type finish that gives the appearance of carpeting. The new product is slip-resistant and easy to keep clean, the company states. Available in gray, burgundy and green, the treads come in two sizes, 9 by 18 and 9 by 24 inches. They are also available in two styles, the Fremont Standard which has a curved nose to fit stairs, and the Fremont Patented Double Duty Tread with a riser that gives the effect of a continuous stairway.



Rubber Road Data Available

Some interesting data on rubber roads have been made available by the Rubber-Stichting, Delft, Holland. The data comes in the form of two booklets, the first of which is a report of the activities of the Permanent International Association of Road Congresses at its IXth Congress in Lisbon, Portugal, during 1951. Among the papers included in this report is one by Dr. H. C. J. de Decker, research director of Rubber-Stichting, on "The Application of Rubber Powder in Asphalt Road Construction." The second booklet contains a reprint from the Proceedings of the Third World Petroleum Congress, Section VII. This is a paper by Dr. de Decker and H. A. W. Nijveld on "Influence of Rubber Additions on Some Mechanical Properties of Asphaltic Bitumen."

Goodyear Research Appointments

Important assignments in research and development activities of the Goodyear Tire & Rubber Co. were recently announced. A. J. Gracia, formerly affiliated with the office of the vice-president in charge of research and development, has been named assistant manager of research and development activities. The post left vacant by Mr. Gracia's promotion has been filled by James D. D'Ianni, previously in charge of research studies on synthetic rubbers and vinyl plastic materials. Other assignments were those of H. J. Osterhof as director of research and W. W. Vogt as development manager of the Tire & Compounding Division. Working under Dr. Osterhof at the company's research laboratory are A. M. Clifford, manager of organic research; J. A. Merrill, manager of engineering research; and H. A. Endres, manager of rubber and plastics research. Mr. Gracia joined Goodyear as a staff trainee in 1928, following his graduation from the Massachusetts Institute of Technology. Assigned to research activities that same year, he was advanced to the post of chemical engineer and in 1942 was named manager of the Chemical Engineering Division. During the war, he was in charge of chemical engineering for the company's synthetic rubber operations, and following the war was in charge of the chemical engineering development laboratories. Two years ago he moved to the office of the vice-president. Dr. D'Ianni was graduated from the University of Akron, and obtained his doctor's degree from the University of Wisconsin. He joined Goodyear in 1938 as a research chemist. In 1946 he was assigned to the Office of Rubber Reserve in Washington, D. C., in charge of the Polymer Research Branch.

Gro-Cord Re-elects Officers

At the organizational meeting of the board of directors of the Gro-Cord Rubber Co., held in conjunction with the 33rd Annual Stockholders' Meeting on February 25th at Lima, Ohio, all company officers were re-elected. F. W. Cook is president of the company, while Forest Moor is vice-president and general manager. I. S. McKindsey is vice-president and sales manager and Harold Smith is vice-president and assistant treasurer. Melvin C. Light is assistant secretary of the company. Virgil M. Knisely has been elected to the board of directors. All other company directors were re-elected, including Mr. Cook, Rodney P. Lien, Mr. Light, Mr. Moor and Mr. Smith.

Aromex 115 Carbon Black

J. M. Huber Corp., New York, N. Y., has announced "Aromex 115," an improved high abrasion furnace black. According to the company, road tests have demonstrated longer tread wear, especially with synthetic rubber stocks incorporating this new pigment. Aromex 115 is said to impart high electrical conductivity to rubber stocks and features good processing characteristics. The product is available in pellet form, in 50-pound bags or in bulk.

LOS ANGELES NEWS

Approximately 220 members and guests attended the Los Angeles Rubber Group meeting Tuesday evening, March 4th, in the Rainbow Room at the Mayfair Hotel in Los Angeles, Calif. Dr. R. V. Yohe, President of American Anode, gave the technical talk, his subject being "Liquid Systems—The Shape of Things to Come."

The post-dinner program consisted of a program of entertainment. Amateur vocal talent was furnished by Bob Reese (American Anode), Elliot McLaughlin (H. M. Royal), and M. A. MacDonald (Pacific Hard Rubber). These gentlemen acted as leaders in community singing, with the entire attendance taking part.

The door prize was won by Harold Hall (Kirkhill Rubber). Raffle prizes were won by Mike Rochowicz (U. S. Rubber), E. C. McLaughlin, Bob Ewen (Xylos Rubber), Paul Faber (United Rubber), Bert Bilicller (H. Muehlstein), Ray Stringfield (Fullerton Mfg.), and Dallas Heatherly (U. S. Rubber).

In his address, Dr. Yohe said that the rubber latex industry is particularly noted for the manufacture of foamed rubber, rubber products made by dipping and coating processes and various protective coatings. During the past few years liquid plastics have been developed which in many cases are being used to make products which replace rubber products made from latex. They are also being used for the manufacture of other products not heretofore possible from latex. The latex industry, therefore, is presented with a competitive newcomer which to a degree threatens the future of the industry.

Recent high prices for natural rubber latex, and the inadequacy of synthetic latices to fully replace natural latex in all its uses, have handicapped the development of new uses for the various rubber latices. It can therefore be contended that the latex industry needs a stabilized price level for natural latex which level is much lower than has recently been the case. Likewise, research should be directed in the line of an all-purpose synthetic latex to replace natural latex should the supplies of this valuable material be cut off due to world conditions.

The latex industry must also devote itself to the development of new methods for the use of liquid rubber systems, which new methods will lead to a wide variety of new products, the speaker said.

Liquid plastics, mainly in the realm of plastisols, plastigels and organosols, are rapidly finding many new uses. Not only are these materials replacing rubber latices for dipping, coating and casting, but they are also replacing milled plastics where milled plastics were used for molding and calendering. It is estimated that within a few years these liquid plastic materials may account for as much as 25% of the over-all plastics manufacturing business in this country.

The use of liquid materials for these manufacturing methods requires lighter equipment, involves fewer mechanical hazards and less expensive machines than are normally used in the rubber and plastic industries. It may, therefore, be concluded that the field for liquid systems has a great potentiality for the future.

The April 1st meeting of the group, also held at the Hotel Mayfair, attracted 240 members and guests. The meeting was sponsored by the Firestone Tire & Rubber Co. H. H. Weidenmann, factory manager of the company's plant in Los Angeles, presided. The meeting was addressed by Freeman Lusk, television and radio commentator, who spoke on "Freedom is Not Free." Mr. Lusk's premise was that maximum individual freedom is possible only in a capitalistic profit and loss system.

The technical meeting was addressed by Dr. I. Drogin, director of research for the United Carbon Co. Dr. Drogin's address on "Methods of Compounding Research" was similar to one he delivered before the March 11th meeting of the Ontario Rubber Section of the Chemical Institute of Canada. A report of this meeting appears elsewhere in this issue.

B. F. Goodrich Co. has disclosed it was going ahead with a major addition to its Los Angeles plant that will cost "in excess of $2,000,000." The project, which has been under consideration for several months, has received the "green light" from the National Production Authority which authorized use of various critical materials.

The building plan will enable Goodrich to increase present tire and tube production there by more than 20 per cent. It is the first major expansion there since Goodrich began operations in California in March, 1928.

Included in the changes will be a new and more efficient curing room, relocation and modernization of the tube manufacturing department, machine shop and cafeteria. The construction plan calls for 175,000 square feet of additional floor space, giving the plant a total area of 803,748 square feet devoted to production and warehousing. It follows the completion last year of a new 100,000 square foot finished goods warehouse.

Plans for construction of a huge warehouse and office building in the new central manufacturing district in Los Angeles have been announced by the Goodyear Tire & Rubber Co. Increased production at Goodyear's Los Angeles plant is the reason for the expansion. The modern 309,000 square-foot building, covering 12 acres of a 15-acre tract, will be located at Garfield and Washington boulevards near Vail airport. Efficient and rapid movement of material will be assured by truck facilities on one side of the building and by a railroad spur running along the other side.

Parking space for 100 cars is planned, and the area in the rear of the building provides room for possible future expansion. Construction of Goodyear's modern warehouse will save tons of vital steel by utilizing an extra heavy concrete in a precast, tilt-up building process. Designed and to be built by the William P. Neil Co., Ltd., engineers and contractors, the new warehouse and office building is financed by the Prudential Life Insurance Company and will be leased from them by Goodyear on a 25-year basis.

Drace Kutnewsky, formerly associated with the Gates Rubber Co. in Denver, Colorado, has joined the technical staff of the Burke Rubber Co., San Jose, Calif.

Herb Larson, assistant advertising manager of the W. J. Voit Rubber Corp. for the past four years, has been advanced to the position of advertising manager of the company. Mr. Larson, a graduate of Glendale High School and the University of Chicago, will be in charge of all advertising and publicity for the various corporation departments, including sporting goods, automotive hose and camelback manufacture.

The Los Angeles Rubber Group held its first 1952 Golf Tournament at the Hacienda Country Club in La Habra Heights, Calif. Some 35 members and guests attended. Prizes were won as follows:

Low Gross, Wilbur Johnson (Dupont); *Low Net*, Gene Huxley (Western Insulated Wire); *Best Tee Shot*, Bob Maney (Goodyear); *Longest Putt*, K. Courtois (U. S. Rubber); *Longest Drive*, Alex Siamas (Rubber Tech.); *Fewest Number of Putts*, Jack Martin; *Blind Bogey*, Hal Holmes (Shell Oil); *High Gross*, Dick White (Caram Mfg.).

Al Pickard (Braun) of the TLARGI Educational Committee has announced that the Education Fund has now reached the sum of $70,000.

Dan E. Budnick has succeeded Howard Chamberlain at the Kirkhill Rubber Co. Mr. Chamberlain recently announced his retirement.

Dick Behrman, formerly factory manager of the U. S. Rubber Co. plant at Los Angeles, has been transferred to Akron as assistant production manager.

Fran Beiter, formerly factory manager of the Golden West Rubber Co., has been appointed a vice-president of the company.

Monsanto Chemical Promotes Tomlin

The appointment of Andrew J. Tomlin as assistant manager of rubber chemical sales has been announced by the Organic Chemicals Division of the Monsanto Chemical Co. Mr. Tomlin, whose headquarters will be the division's Rubber Service Department at Akron, Ohio, has been technical service manager of the department since 1945. A native of Shelbyville, Ind., Mr. Tomlin was graduated from Purdue University in 1924 with a B. S. degree in chemical engineering. He joined Monsanto in 1939.

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CANADIAN NEWS

Exports of Canadian rubber products in 1951 showed an increase of 139% over the preceding year, it was reported by Greig B. Smith, manager of the Rubber Association of Canada, at the annual meeting of the association at the Royal York Hotel in Toronto, Ont., Canada. Total exports in 1951 amounted to $29,067,000, compared with $12,153,000 in 1950.

Mr. Smith pointed out that, while rising costs were partially responsible for the marked increase, sales volume doubled or trebled in some lines. He said that while Canada's principal markets were spread throughout Europe, Asia, Africa, South and Central America, the United Kingdom continued to be Canada's chief buyer of waterproof and canvas footwear, and South Africa continued to provide the major market for rubber clothing. Imports of rubber and rubber products reached a record value of $19,834,000, according to Mr. Smith's report. This was an increase of 36.4% over the 1950 figure of $14,543,000.

Mr. Smith said the world production of new rubber during 1951 amounted to a record 2,775,000 tons. Of this total, 1,870,000 tons were natural rubber and 905,000 tons were synthetic. While natural rubber production remained about the same as in 1950, the output of synthetic increased by almost 70%. The average invoice value of all grades of crude rubber imported into Canada during 1951 was 55.8 cents per pound compared with 29.2 cents in 1950.

Domestic sales of tires during 1951 totaled 4,610,868, some 10% below the 1950 figure. Total sales of footwear, at 11,309,073 pairs of waterproof and 3,345,838 pairs of canvas, showed little change from the figures for 1950. Increased sales of rubber sheet packing, transmission and conveyor belting and industrial hose, made the mechanical goods division one of the brighter spots in the industry's 1951 picture, Mr. Smith said.

The harmful effect of severe taxation and credit restrictions on the rubber industry during the second half of 1951 was emphasized by C. C. Thackray, president of the association. He referred to the decreased volume of sales of tires and tubes which are taxed 35% which "is regarded as an inordinate burden imposed on a form of transportation indispensable to our modern economy."

Revocation of Canada's trade agreement with Czechoslovakia as a means of curbing the dumping of rubber footwear on the Canadian market, was urged by Mr. Smith. Two other cases of dumping, involving bicycle tubes from Norway and Germany, were acted upon by customs authorities in Ottawa after the association substantiated them, the manager said.

The following officers and directors were appointed for 1952: *President*, R. C. Berkinshaw (Goodyear); *Treasurer*, J. R. Belton (Gutta Percha); Directors for 1952 are: J. I. Simpson (Dunlop Tire); W. H. Funston (Firestone); I. G. Needles (Goodrich); J. W. H. Miner (Miner Rubber); M. L. Brown (Seiberling Rubber); J. D. Morgan (Viceroy Mfg.).

Ohio-Apex, Inc., Nitro, W. Va., has appointed Canada Colors and Chemicals Ltd., 1090 King Street West, Toronto, Canada, as sales representatives in Eastern Canada for its plasticizer and chemical products. A division of Food Machinery and Chemical Corporation, Ohio-Apex, Inc. maintains sales outlets in most major cities in the United States for a wide variety of phthalate, phosphate, adipate and fatty acid type plasticizers. The Nitro plant also manufactures anhydrous aluminum chloride, phosphorus compounds, aralkyl chlorides and alcohols. Canada Colors will handle warehouse stocks at its Toronto plant. The move is designed to facilitate distribution of products and provide more efficient service to Canadian customers, company officials explained.

L. A. McLeod, who joined Polymer Corp., Ltd., at Sarnia in the fall of 1950, has been appointed research chemist in charge of physical research in the Research and Development Division of that organization. Dr. McLeod received his B.Sc. in chemistry from the University of Alberta in 1941 and a Ph.D. from McGill University in 1944. Prior to joining Polymer Corp. he was associated with the National Research Council at Ottawa.

C. D. Howe, Minister of Trade and Commerce, in a recent statement before the Canadian House of Commons, reported that the Polymer Corp. ended its fiscal year with an operating profit of about $9,000,000, more than twice the $4,151,710 figure of the previous year. The Canadian government has an original investment of $38,000,000 in Polymer, so that the profit works out at something over 23%. Polymer's fixed assets are now estimated to be worth $68,404,000, the extra $30,000,000 having come out of earnings returned to the business.

Mr. Howe's figures were presented during discussion of plans for a re-arrangement of the company's financial structure. Hitherto, the company has been an operating entity only, all ownership of assets being vested in the Crown. Now, the government is to take 2,000,000 shares of common stock, representing $30,000,000 in fixed assets, and $8,000,000 in 4% serial debentures maturing $1,000,000 a year, starting March 1, 1953. No change is contemplated in the policies or management of the corporation.

According to reports from Canada, the new British budget may benefit Canadian manufacturers of rubber footwear. Early in World War II, Great Britain established a purchase tax on certain imported goods, including rubber footwear. Before this ruling went into effect, Canada, for example, between 1936 and 1938 exported rubber footwear to Britain with an average value of $3,700,000 a year. In 1950, however, total shipments were less than $400,000. Imports into Britain have now been put on a par with domestic production, so that Canada may regain a portion of the rubber footwear market in Great Britain.

Bakelite Co. (Canada), Ltd., has announced that construction is now underway on a new plant at Belleville, Ont., for the production of formaldehyde. Standard Chemical Co., Ltd., has been named distributors for the formaldehyde materials to be produced by this new plant.

Ohsol Named to New Post

Dr. Ernest Ohsol of the Chemical Division of the General Electric Co., Pittsfield, Mass. has been appointed manager of the new product development laboratory. A 1936 graduate of the College of the City of New York, Dr. Ohsol also holds degrees from Massachusetts Institute of Technology and the Swiss Federal Polytechnic Institute. Prior to his association with General Electric, Dr. Ohsol was employed by the Standard Oil Development Co. as a chemical engineer. He came to General Electric in February, 1950 as manager of the process development laboratory, a position he has held until his present appointment. He is a member of the American Chemical Society and the American Institute of Chemical Engineers.

Dow Corning Industrial Exhibit

The unique properties of the silicones in general and the specific industrial advantages offered by the various types of silicones, such as Silastic Rubber, are currently being demonstrated to industry by means of a remarkable industrial exhibit prepared by the Dow Corning Corporation of Midland, Mich. The exhibit, now being shown in various industrial centers, comprises 24,000 pounds of demonstration units, parts and assemblies, and is so designed that the visitor can usually determine for himself on the spot where one or more of these silicones can be adapted to his own particular problems. Considerable attention is paid in the exhibit to the numerous advantages offered by Silastic Rubber.

License Four Vinyl Fabricators

U. S. Rubber Co. has licensed four manufacturers of vinyl coated fabrics to manufacture and sell its stretchy vinyl plastic upholstery, made with strong, knitted fabric backing. The four manufacturers licensed to make the new material are the Masland Duraleather Co. of Philadelphia, Penna., makers of Duran; Federal Leather Co. of Belleville, N. J., makers of Federan; Landers Corp. of Toledo, Ohio, makers of Versilan; and Textileather Corp. of Toledo, Ohio, makers of Tolex. Stretchy upholstery, called "Elastic Naugahyde," was introduced in 1950.

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OBITUARIES

Albert G. Partridge

Albert Gerry Partridge, recently appointed vice-chairman of the board of directors of the Goodyear Tire & Rubber Co. of Canada, Ltd., and for the past 16 years president of the company, died on March 12 at the Canada General Hospital, Toronto, Ont., Canada, after several weeks' illness. He was 71 years old. Born and educated in Jamestown, N. Y., his first job was that of clerk with the Diamond Rubber Co. at Akron, Ohio. Later he joined the Firestone Rubber Co. as first manager of the Pneumatic Tire Department, and served from 1905 to 1920 as the company's vice-president and sales manager.

Mr. Partridge joined Goodyear in 1920 as manager of the Western Division in the United States. In 1928, he was appointed managing director of Goodyear's manufacturing and sales operations in Great Britain. He came to Canada in 1935 as vice-president and director of the Canadian company. The following year he was made president of the Goodyear Tire & Rubber Co. of Canada, Ltd. He also assumed the presidency of the Goodyear Cotton Co., St. Hyacinthe, Quebec, and served on the board of directors of both these companies. He was named vice-chairman of the board of directors in February, 1952.

Mr. Partridge was a director and past-president of the Rubber Association of Canada, a member of the Executive Council of the Canadian Chamber of Commerce and member of the board of directors of the Canadian International Chamber of Commerce. During the war years he served as a member of the advisory committee on rubber and synthetic rubber, Department of Munitions and Supplies, Ottawa. He also served as a member of the Planning Board of the City of Toronto. Surviving are his son and two daughters.

Charles Hoffman

Charles Hoffman, a founder of the Mansfield Tire & Rubber Co., and last living member of the company's original board of directors, died on March 29 at his home in Mansfield, Ohio. He was 79 years old and the father of James M. Hoffman, the company's present executive vice-president.

Harvey N. Dauler

Harvey Norton Dauler, chairman of the board of directors of the Neville Co., Pittsburgh, Penna., died in that city on March 26 following an operation. He was 73 years old. Mr. Dauler was the founder of the Neville Co. He was a member of the Duquesne Club and many trade organizations.

Harry D. Minich

Harry Dudley Minich, president of the Tensolite Corp., North Tarrytown, N. Y., and treasurer of the Tensolite Insulated Wire Co., Inc., Tarrytown, N. Y., died on March 22 in Tarrytown Hospital. He was 62 years old. Born in Indianapolis, Ind., Mr. Minich obtained his B. A. degree from Harvard University in 1913. Before the first World War, he founded the Republic Truck Co. In later years he served as controller and treasurer of the Allied Chemical & Dye Corp., the Grisby Grunow Radio Co., and the L. C. Smith-Corona Typewriter Co. For several years he served as executive vice-president of the Sonotone Corp. After joining the firm of Johnson & Johnson, Inc., New Brunswick, N. J., as treasurer and controller, he switched his interest from administration to experimentation and invented the Tensolite process for the making of bristles, decorative ribbons, yard goods, yarn and wire insulation. Mr. Minich perfected an insulated resistance wire for use in heated flying suits by World War II airmen. He was a member of the Controllers Institute of America, the Sons of the American Revolution and the Harvard Club. He is survived by two sons and three daughters.

Howard P. Protheroe

Howard P. Protheroe, associated with the Goodyear Tire & Rubber Co. for 34 years and former manager of the company's Mechanical Goods Compound Division, died on March 4 at his home in Akron, Ohio. He was 67 years old. Born in Scranton, Penna., Mr. Protheroe was a graduate of the University of Pennsylvania. Mr. Protheroe was one of the heroes of the disastrous Crile Hospital Clinic fire in May, 1929, in Cleveland, Ohio. He was credited with saving the lives of 20 patients and nurses at the clinic. In honor of his act, Goodyear placed a bronze plaque in the entrance to Goodyear Hall in Akron. In 1942, Goodyear loaned Mr. Protheroe to the War Production Board in Washington, D. C., to aid the government in the rubber conservation program. Services were held on March 7 at the Westminster Presbyterian Church in Akron with interment in Rose Hill Burial Park. His wife and son survive.

Franklin C. Edson

Franklin Churchill Edson, retired president and chairman of the board of the Asbestos Manufacturing Co., Huntington, Ind., died on March 1 at his home in Pelham, N. Y. He was 69 years old. Mr. Edson was a member of the Racquet and Tennis Club of New York, the New York Yachting Club, the Detroit Athletic Club, and the Manursing Island Club of Rye, N. Y.

Joseph Torrey

Dr. Joseph Torrey, an important figure in the early days of the rubber industry in Akron, died suddenly on March 6 in San Diego, Calif. He was 90 years old. A chemist, he was a former executive of the old Diamond Rubber Co., later acquired by the B. F. Goodrich Co., and of the Northwestern Rubber Co. of England, an affiliate of Diamond Rubber. Dr. Torrey, born in East Hardwick, Vt., formerly was a professor of chemistry at Harvard University. He received his degree from Bowdoin College. He served as chief chemist under A. H. Marks at Diamond Rubber, and was primarily responsible for the development of the Marks process for the reclaiming of rubber by the use of alkali. Later, Dr. Torrey was vice-president and general manager of the first reclaiming plant in Europe, established by Diamond Rubber under the name of Northwestern Rubber Co. in Litherland, suburb of Liverpool, England. While in Europe, he held a leading position in the organization and presentation of international rubber conventions between 1908 and 1914. Dr. Torrey had lived in San Diego since his retirement from active work in 1923. He is survived by his son and four daughters.

Joseph A. White

Joseph A. White, sales manager of the William F. Mayo Co., a division of the U. S. Rubber Co. in Boston, Mass., died of a heart attack on February 28 at Pompano Beach, Fla. He was 57 years old. A native of Houlton, Maine, Mr. White had been associated with U. S. Rubber for more than 25 years. Starting as a salesman of the Footwear Division in the Boston branch in 1926, he became sales manager of that branch in 1941. He was appointed sales manager of the William F. Mayo Co. in February, 1946, the position he held at the time of his death. Funeral services were held on March 4 in Newton, Mass., with interment in Bangor, Maine. His wife survives.

William F. Gillespie

William F. Gillespie, founder and president of the Stamford Rubber Supply Co., Stamford, Conn., died in that city on March 17 after a long illness. He was 63 years old. He was also vice-president of Gillespie Brothers, Inc., publishers of the *Stamford Advocate*. A native of Stamford, Mr. Gillespie was graduated from Yale University in 1900 and soon afterward founded the rubber supply company. Mr. Gillespie was very active in local civic affairs. He is survived by his wife, three sons and a daughter.

Frederick J. Dole

Frederick J. Dole, since 1899 president, treasurer and a director of the Francis H. Richards Manufacturing Co., New York, N. Y., died at his home in that city on March 25. The Richards company manufactures golf ball molds and equipment. Surviving are his wife and a son by a former marriage.

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George W. Scott

George W. Scott, a member of the Rubber Division, National Production Authority of the Department of Commerce, died suddenly at his home in Washington, D. C., on March 1. Born in Scranton, Penna., on February 22, 1898, Mr. Scott was previously in charge of the Sales Division of the Office of Rubber Reserve, Reconstruction Finance Corp. Mr. Scott had been in government service for a period of 20 years. He was a graduate of the School of Foreign Service of Georgetown University in 1925 and was a veteran of World War I. Funeral services were held at his home on March 3 while interment, with military honors, was at Arlington National Cemetery.

Hugh W. Gregory

Hugh W. Gregory, vice-president in charge of sales and a director of the Seiberling Rubber Co. of Canada, Ltd., died recently in Toronto General Hospital, Toronto, Ont., Canada. He was 62 years old. Born in Whitehall, Va., Mr. Gregory was a veteran of World War I. He was formerly associated with the B. F. Goodrich Co. for a period of four years, after which he joined Seiberling Rubber at Los Angeles, Calif. in 1932. He was transferred to the Canadian affiliate in 1937. Mr. Gregory was a member of the Society of Automotive Engineers. His wife and son survive.

Adrien Cambron

Adrien Cambron, co-director of the Division of Chemistry of the National Research Council of Canada at Ottawa, Canada, and director of the Applied Chemistry Branch, died on February 22 in Ottawa after a lengthy illness. He had been associated with the Council since 1930 and in 1946 was awarded the Order of the British Empire for his outstanding work, particularly in the field of petrochemicals. Dr. Cambron was active in several scientific societies, including the Chemical Institute of Canada for which he served for several years as Director of Scientific Affairs.

Francis M. Turner

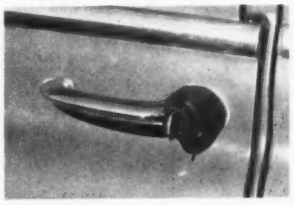
Francis M. Turner, vice-president of the Reinhold Publishing Co., died on April 3 at the Manhasset Medical Center, Manhasset, L. I., N. Y. He was 61 years old. Mr. Turner was well-known in the chemical industry and in the technical book and magazine field. Born in Brockville, Ont., Canada, Mr. Turner was a graduate of Trinity College of the University of Toronto.

Robert Emmett Powers

Robert Emmett "Jake" Powers, associated with the Public Relations Department of the B. F. Goodrich Co. for 20 years, and one-time city editor of the *Akron Beacon Journal*, died in Akron, Ohio, on March 30. He was 57 years old. Mr. Powers entered the newspaper field in 1913.

Neoprene "No Freeze Boot"

Designed to put an end to frozen car door locks, a molded neoprene boot developed by H. H. Appenzeller, Box 251, Syracuse, Ind., fits late model General Motors automobiles. Named the "No Freeze



Boot," the product covers the entire push-button assembly so that water cannot enter the key hole to freeze the mechanism. The key is inserted through a slit in the cover opposite the keyhole. When the key is withdrawn, the slit snaps shut and prevents moisture from entering. The neoprene boot is resistant to sunlight and weathering.

Settle Goodrich Office Strike

The five-week strike of office workers at the B. F. Goodrich Co. in Akron was ended on April 4. Under terms of the settlement the union agreed to call off the strike, withdraw its unfair labor practice charges, and consent to an election under the supervision of the National Labor Relations Board to determine whether Local 5 is to continue as bargaining agent for the company's 1100 office workers. The company agreed to grant the union a modified union shop contract if it wins the NLRB election, provide the union with salary, promotion and other data concerning salaried employees in the bargaining unit if it wins the election, and to permit strikers to return to their jobs without discrimination. The election will be held on April 30. During the strike some 12,000 production workers were made idle because pickets succeeded in stopping the flow of materials in and out of the plant. The strike witnessed court injunctions, arrests, mass picketing and bitter exchanges on both sides.

Predicts Banner Year in 1952

Tire dealers who are aggressive and who make special effort to expand their sales should experience a banner year in 1952, R. S. Wilson, vice-president in charge of sales of the Goodyear Tire & Rubber Co., predicted in the current issue of the *Goodyear News*, dealer magazine published by his company. The tremendous car production of 1949 and 1950, amounting to 11,500,000 vehicles, with the corresponding possibilities for replacement tire sales should constitute a challenge to the wide-awake tire dealer, Mr. Wilson declared. He also cited the 1952 forecast for a 34% increase over the 34,300,000 tires sold in 1951, or a total of 45,000,000 tires—the industry's estimate of the replacement passenger car shipments for the current year.

Honored for Government Service

Business men who served without compensation to help the United States set up its defense production program were recently honored at a special luncheon in Washington, D. C., and presented with Certificates of Service. The luncheon and presentation of certificates were arranged by Secretary of Commerce Charles Sawyer and his agency's Business Advisory Council. Among the 188 business men to receive the award were representatives of the rubber industry, including: George L. Allison (Goodrich), Charles W. Ange (Okonite), John M. Ball (Midwest Rubber Reclaiming), Grover W. Brown (Okonite), Harry M. Damenbaum, Jr. (Aldan Rubber), Lee W. Eighmy, Jr. (Kerite), Leonard R. Ervin (Boston Woven Hose), Ward E. Fisher (Armstrong Rubber), Thomas H. Fitzgerald (U. S. Rubber), William P. Harty (Avon Sole), Clyde E. Hoover (Pequanoc Rubber), Robert P. Kenney (Goodrich Chemical), Sidney K. Lamden (Dayton Rubber), William S. Long (U. S. Rubber), Franklin R. Mathews (Mansfield Tire), Robert M. McCann (Firestone), Joseph W. Mullally (Anaconda Wire), Eugene A. Roberts (Armstrong Rubber), Glenn E. Rolston (Rome Cable), Leland E. Spencer (Kelly-Springfield), Albert H. Wechsler (Converse Rubber), Richard S. Wharton (Hewitt-Robins), Western Wiles (Faultless Rubber), and E. Dan Wooldridge (Oliver Tire).

U. S. Centipede Grip Tire

The Tire Division of the U. S. Rubber Co. has announced a new passenger car tire, the U. S. Centipede Grip. Designed for cars requiring conventional pressure tires, the Centipede Grip offers owners of pre-1948 models a tire with skid and traction features not available before at popular prices, the company states. The tire features a continuous seven row tread with literally hundreds of biting, digging tread edges. The special shoulder design makes for cooler running by dissipating heat. This feature together with a tough, durable tread means longer and more dependable mileage, the company maintains. The new tire is now available in three sizes: 6.00 x 16, 6.50 x 16, and 6.50 x 15.

Data on 1951 Philblack Production

According to the recent annual statement issued by the Phillips Petroleum Co., which included data on its subsidiary companies, the combined production of Philblack A and Philblack O in 1951 amounted to 212,773,605 pounds, an increase of 18% over the previous year. Additions to existing facilities, scheduled for completion in the current year, will increase production capacity to 290,000,000 pounds per year.

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Producing strong flexible hose with this Fidelity Hose Reinforcement Machine at lower cost puts you ahead of competition. Produced in continuous lengths at over 1,000 feet every hour, *Knit*-Reinforced is widely used as garden, automotive heater and radiator, and industrial hose.

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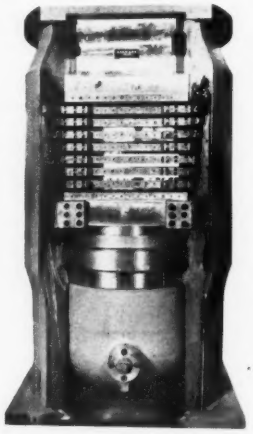
NEW EQUIPMENT

Adamson United Barrel-Type Press

A new type of curing press, designed to meet the demand for press equipment with much higher platen pressures and less deflection, occasioned by the advent of synthetic rubbers and transfer molding, has been developed and introduced by the Adamson United Co., 70 Carroll St., Akron 4, Ohio. The new press, which meets modern requirements without substantially increasing press sections and does not require the installation of special high-pressure hydraulic units, is intended for use in molding close-tolerance items, such as gas masks, carburetor diaphragms, crash helmets, etc. It has been termed the Barrel-Type Press.



The new type press has circular side plates. These plates conform to the shape of the hydraulic cylinder and press head. These three component parts, which are subjected to the hydraulic load, are all accurately machined to jigs and the nature of the machine work on these parts is such that extremely accurate fits between the component parts are always assured. The curved construction of the side plates contributes to increased rigidity of the press.

The conventional method of using studs for holding the strain members or side plates to the cylinder and press head has been discarded. The studs are replaced by top and bottom register plates. These plates, also accurately machined to conform to the outside machined surfaces of the members to which they are attached, eliminate the old difficulty of loosened studs and resultant wear on the very important tongue-and-groove connection between strain plates and adjacent members. The curved side plates are of cast steel and designed to afford accurate guiding of bolster and platens. This type of press is easily accessible to the press operator from both the front and rear. The design lends itself to any number of press openings, as the intermediate platen hangers are very easily arranged.

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B. Another Banbury rotor is added to the stock rack maintained at the Farrel-Birmingham repair plant.

In spite of the rugged design and construction of the Banbury, hard service and abrasive wear eventually make repairs to the machine a necessity. When this time comes there are three very good reasons why Farrel-Birmingham should handle your Banbury repairs:

1 *Farrel-Birmingham is the ONLY company having drawings showing the original dimensions of every part of the Banbury.* When any one of the 775 parts of a Banbury in service needs replacement, a Farrel-Birmingham engineer can look at a drawing and specify the right part in a matter of minutes.

2 *Farrel-Birmingham is the ONLY company having complete jigs, fixtures and gauges necessary for satisfactory repairs.* 242 of the pieces of a Banbury have to be machined, calling for a total of 882 operations to finish.

3 *Farrel-Birmingham, as the developer and manufacturer, can best determine what is required to restore a Banbury to its original work capacity.* When a part—such as a rotor, a door top, or the inside of the chamber body, for example—becomes worn, blueprints show the Farrel-Birmingham engineer just how much rebuilding is required to return the part to its original size, contour and work efficiency. There is no guessing—everything is down in blue and white.

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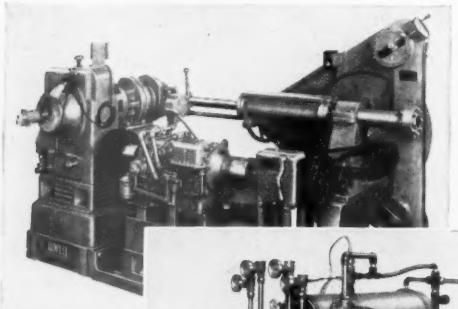
To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

Licensees of Western Electric Company

JOHN ROYLE & SONS
10 ESSEX STREET, PATERSON 3, NEW JERSEY

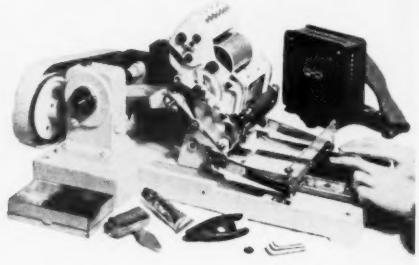
In the last twenty years, platen pressures have increased from 400 pounds per square inch to more than 1200 pounds per square inch. In the new type of press, the ram diameters can be made the same as the width of the platens. In a press with 24 x 24-inch platens, the ram diameter can also be made 24 inches and the resulting platen pressure is approximately 76% higher than is possible on conventional presses. Deflection is reduced to a minimum, as the ram area approaches the area of the bolster. The new type press takes up no more room than the conventional press and has lines which have eye-appeal as well.

To date, the press sizes in actual use range from single and duplex laboratory units with 12 x 12-inch platens to medium-size units with 32 x 32-inch platens. Larger sizes are being designed and will be available in the very near future.

The Barrel Press is also being used in transfer molding. This conversion is simple as a transfer cylinder and pot are built into the press itself and the design lends itself admirably to this type of molding. The required pressures can be very easily produced, deflection is held to almost an unheard of minimum, with a resulting elimination of the normal "flash".

Rejafix Printing Machines

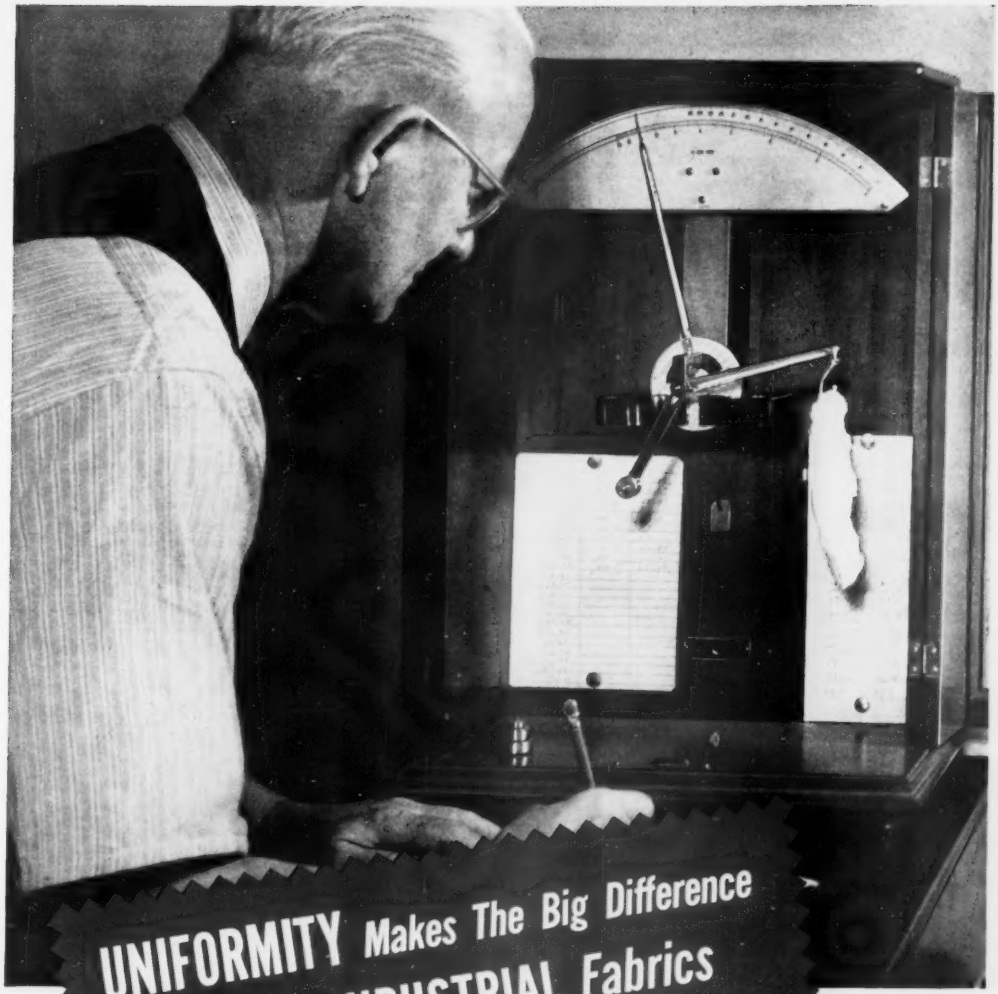
The Rejafix marking and printing machines, which are made in England, are now being distributed in the United States by Popper & Sons, Inc., 300 Fourth Ave., New York 10, N. Y. These machines are said to be the only units which will, by use of metal types or engravings, mark, print or decorate any material such as



rubber, plastics, glass, wood, textiles, etc., irrespective of the shape of the item. They may also be used to print on flat metal surfaces but in such cases rubber type or engravings must be utilized.

According to the distributors, the Rejafix machines will handle any or all portions of a labelling problem from the imprinting of a control number or one line of text to the complete label. Standard machines are available in a variety of sizes, ranging from small, hand-operated units to large, fully-automatic units. The manufacturers frequently design and construct special printing machines to handle special problems.

Among rubber products which are currently being printed with Rejafix machines are toy balloons, playballs, gloves, cables, toys, and similar items.



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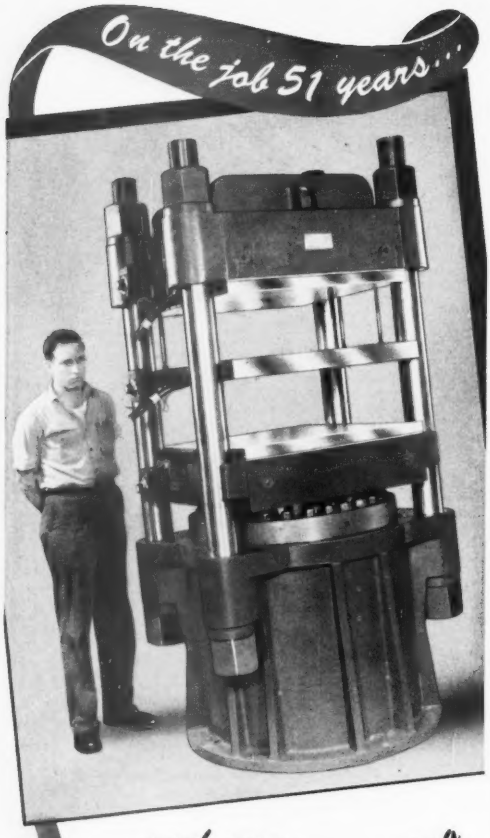

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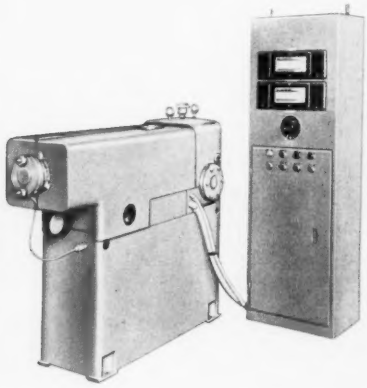
440 N. Sacramento Blvd., Chicago 12, Ill.

NRM Model 50 Plastics Extruder

The availability of its new Model 50 two and one-half-inch electrically-heated plastics extruder has been announced by the National Rubber Machinery Co., of Akron, Ohio. Designed for use in the latest extrusion techniques, the Model 50 has a number of new features.



These include a more convenient control cabinet for left-hand or right-hand operation; a faster operating die adapter gate for quicker die and screen changes; a single, sturdy fabricated steel base for both drive transmission and cylinder; a heavy duty cone gear for greater drive and longer life; and a more compact, streamlined over-all design for easier, safer operation. Standard NRM features that have been retained are the hollow bored feed screw of heat-treated alloy steel with flame hardened flight surfaces; the unique and positive "Balanced Heat Control"; the water cooled feed hopper; the replaceable Xaloy 306 cylinder liner, and the proportioning type pyrometer controls. Complete accessories are also available.

Long Flex Life?

SEE PAGE 4

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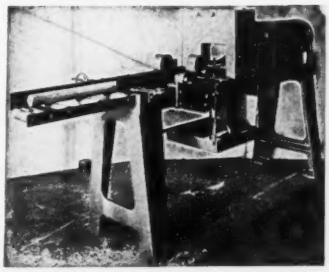

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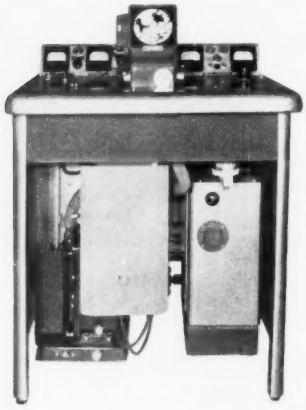
LACQUERS SYNTHETICS JAPANS ENAMELS

Farrand Electron Microscope

The availability of a new type of electron microscope, which incorporates an electrostatic lens system, has been announced by the Farrand Optical Co., Inc., Bronx Boulevard and East 238th St., New York 70, N. Y. By this choice design, according to the manufacturers, complexities have been minimized and numerous advantages derived, which have made possible the production of an instrument for broader and more general use in scientific and industrial laboratories. Actually,



the operation of the instrument has been simplified to that comparable with an ordinary light microscope. Service and maintenance requirements have been reduced to a negligible magnitude, making it possible for the instrument to be used by less skilled laboratory technical personnel.

Features of the Farrand Electrostatic Electron Microscope include a resolving power of 30 au, freedom from astigmatism, ease of alignment, distortionless image at all magnifications, and consistent high image quality at direct magnifications up to 20,000X. The image of the specimen does not rotate with changes of magnification, which is of particular importance in stereo studies. Alignment is simplified since the electrical centers in electrostatic lenses coincide with the geometrical centers. The electron gun is of high intensity and efficiency, and filaments are easily and quickly replaceable. Adjustment for pinhole position and beam alignment can be made during operation of the instrument. The specimen holder is designed to permit manipulation in three translational motions.

The power supply for the new electron microscope is small, compact and easy to service, while the output voltage is variable, making operation possible over a wide range without change of focus. The unit has a large area viewing screen and a built-in camera arrangement without an air lock. The specimen holder permits rapid change and setting of the specimen. The unit is adaptable for electron diffraction as well as other techniques.

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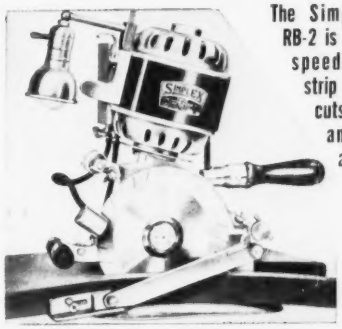

The Simplex Model RB-2 is a new high-speed, portable strip cutter that cuts efficiently and accurately.

The new Model RB-2 has a maximum cutting thickness of two inches, weighs 44.5 pounds, and is available in both A.C. and D.C. types. Manually operated, the machine is capable of cutting up to 20,000 feet of rubber strip in eight hours. A series of slits in the edge of the cutting blade carries water from a reservoir into the cut and not just to the top of the rubber being cut. This method lubricates the entire cut and produces a straight and even edge.

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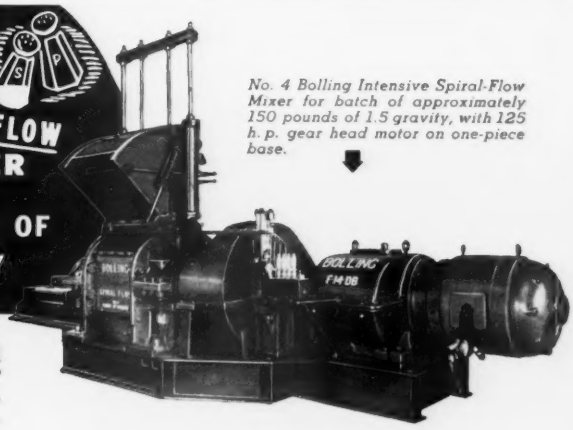

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REVIEWS

BOOKS

Machinery and Equipment for Rubber and Plastics. Vol. I —Primary Machinery and Equipment. Compiled by R. G. Seaman and A. M. Merrill. Published by India Rubber World, 386 Fourth Ave., New York 16, N. Y. 6 x 9 in. 804 pp. $15.00 domestic; $16.00 foreign.

As indicated in its preface, this book has been compiled "for those men of the rubber and the plastics industries who are responsible in one way or another for the processing of the various raw materials used by these industries into many thousands of finished products daily." To this end, the book presents comprehensive engineering information on the primary machines and equipment used by the rubber and plastics industries. A second volume, now in preparation, will cover auxiliary equipment and accessories.

The current volume, compiled by the editors of "India Rubber World" with the cooperation of an editorial advisory board, covers mills, mixers, calenders, extruders, presses, etc., in 20 separate chapters, each chapter being further subdivided into sections. Each chapter begins with one or more introductory articles by recognized authorities discussing design trends, construction principles, and applications. This is followed by classified descriptions of specific equipment arranged by supplier and based on information furnished by such suppliers. Advertisements from some of the suppliers appear at the end of almost every chapter. Illustrations are liberally used throughout the text.

The machinery and equipment covered in this first volume include the following: (1) Mills; (2) Mill Accessories; (3) Mixers; (4) Calenders and Accessories; (5) Extruders; (6) Extruder Accessories; (7) Compression Presses; (8) Press Accessories; (9) Injection Presses; (10) Molds and Mold Accessories; (11) Web Coating and Handling Equipment; (12) Pressure Vessels; (13) Heaters, Dryers and Coolers; (14) Tire and Tube Machinery; (15) Hose and Belting Machinery; (16) Footwear Machinery; (17) Wire and Cable Machinery; (18) Sole and Heel Machinery; (19) Latex Machinery; (20) Special Plastics Machinery.

Included among the contributors of the introductory articles are the following: P. C. Taylor (Ohio Rubber), Julian C. Smith (Cornell), E. H. Johnson (Farrel-Birmingham), A. L. Heston (National Rubber Machinery), H. E. Buecken (National Rubber Machinery), E. R. Coddington (National Rubber Machinery), A. J. de Matteo (Watson-Stillman), H. H. Wydom (Brockton Tool), R. C. Quine (Akron Equipment), Harold P. Lamb (Adamson United), Paul Beebe (Goodyear), L. Cranston (U. S. Rubber), W. E. Glancy (Hood Rubber), R. A. Schatzel (Rome Cable), W. E. Kavenagh (Goodyear), and P. D. Brass (U. S. Rubber).

An appendix to the book includes a list of used and rebuilt machinery dealers, some data on accumulators, pumps and intensifiers, and a complete list of the names and addresses of the 350 companies whose products are described in the text. A subject index is also included.

•

Uses of Persulfates—A Bibliography. (Bulletin No. 34). Buffalo Electro-Chemical Co., Inc., Buffalo 7, N. Y. 8½ x 11¼. 20 pp.

This bulletin represents a collection of literature references pertaining to various uses of persulfates. The references, mainly from "Chemical Abstracts" and covering the period from 1907 to 1950, have been selected to show the highly diverse uses to which persulfates may be put, and to stimulate interest in this class of peroxygen chemicals. Of particular interest are the sections on polymerization and depolymerization and the rubber industry.

Light Hydrocarbon Analysis. Edited by O. W. Burke, Jr., C. E. Starr, Jr., and F. D. Tuemmler. Published by Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y. 7 x 10 in. 640 pp. $15.00.

Shortly after the government launched its war emergency synthetic rubber program a Committee on Butadiene Specifications and Methods of Analyses was established. Representing joint efforts of government, academic and institutional organizations, and industry, the primary function of the committee was concerned with analytical control and specification phases of the manufacture and use of butadiene, essential to the production of synthetic rubber. Since the production of butadiene was intimately associated with problems concerning a wide range of light hydrocarbons, the scope of the committee's activities included the study of the detailed analysis of numerous light hydrocarbons. With the publication of this book, which abstracts the information gained as a result of the group effort, the committee completes its war emergency assignment.

The book represents the largest collection of specific analytical procedures yet published in the field of light hydrocarbons. Included in an illustrative manner as various schemes of anaysis employing these methods for a complete assay of highly complex hydrocarbon mixtures. It also offers a new approach to the presentation of analytical procedures by furnishing information on butadiene manufacturing processes as a background for the development of the methods. Extensive information on safe practices in the laboratory handling of light hydrocarbons is included.

There are nine chapters in all, as follows: (1) History and Function of the Committee on Butadiene Specifications and Methods of Analyses; (2) Butadiene Production Processes; (3) Butadiene Specifications and Applicable Test Methods; (4) Schemes of Analysis; (5) Sampling and Handling of Light Hydrocarbons; (6) Safety Precautions for Handling Light Hydrocarbons; (7) Analytical Methods; (8) Preparation of Samples of Known Composition for Test Programs; (9) Evaluation of Accuracy and Precision of Methods. A subject index is provided. The editors are to be congratulated on successfully handling an extremely difficult abstracting job on an extremely complex problem.

•

Manufacturing Processes. (Third Edition). By Myron L. Begeman. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 608 pp. $6.00.

Written primarily for students and professionals engaged in production, industrial, or tool engineering work, this book gives detailed information on all the important manufacturing processes and machines now available. It tells where these machines can best be applied, their advantages and drawbacks, the tools required for each, etc. Like the previous editions, the first half of the current volume is devoted to foundry practice, pattern work, plastic molding, powder metallurgy, hot and cold working of metals, heat treatment, and welding. The second half covers measuring instruments, cutting tools, machines, and their accessories. This third edition has been completely revised to include the machines, processes and machine tools developed in recent years. Several chapters, including that on special casting methods, have been completely rewritten. Much new material has been included, among these being a section on plastic molds.

•

Long-Wearing Machinery Parts. Haynes Stellite Co., a Division of Union Carbide and Carbon Corp., 30 East 42nd St., New York 17, N. Y. 8½ x 11 in. 24 pp.

A wide variety of cast and wrought iron alloy parts now being used in many industries to solve abrasion, corrosion, and high-temperature problems are described in this booklet. More than 60 blueprints, tables and photographs show some of the sizes and shapes in which Haynes alloy parts are being used. The parts described are made of the various Haynes cobalt, iron, and nickel base alloys which have had wide use as metal-cutting tools, jet aircraft parts, chemical equipment, and many types of valve and furnace parts.

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BOOKLETS, CATALOGS, etc.

Aranox. Naugatuck Chemical Division of U. S. Rubber Co., Naugatuck, Conn. 8½ x 11 in. 8 pp.

Technical data on Aranox, the company's new semi-nondiscoloring antioxidant and copper inhibitor, including chemical name and formula, physical properties, compounding properties, and recommended uses, is presented in this report. Suggested formulas for the use of the material in air cured products, in sulfur chloride cured products, in neoprene fabric coatings, and in neoprene products in general are given, with physicals shown for each compound. The effects of Aranox in neoprene and natural rubber are discussed, as is its use as a protectant against copper and manganese.

•

Hercules Dresinate. Hercules Powder Co., Wilmington, Del. 8½ x 11 in. 16 pp.

The properties and a variety of applications for Dresinate, the name given by the company to its series of sodium and potassium salts of rosins and resins, are described in this technical booklet. A description of the grades and properties of dry, liquid and paste Dresinate is given, while sections are devoted to the use of the material for emulsifying soluble oils and for extra-action alkaline cleaning compounds. Other suggested applications are also discussed.

•

Your Investment in Synthetic Rubber. Kentucky Synthetic Rubber Corp., Louisville 1, Kentucky. 8½ x 11 in. 16 pp.

The story of the operations of the Kentucky Synthetic Rubber Corporation is told in this booklet. Photographs trace the manufacture of GR-S in the plant which the company operates for the government, and an excellent flow diagram is reproduced. Officers and directors of the company are listed, as are the 19 companies participating in the operation of Kentucky Synthetic.

•

Esters. Carbide and Carbon Chemicals Co., 30 East 42nd St., New York 17, N. Y. 8½ x 11 in. 36 pp.

This booklet presents data on the esters produced by the Carbide and Carbon Chemicals Co. It is one of a series of publications, each of which describes chemicals in the important aliphatic groups. Such information as physical properties, specifications and test methods and shipping data are included. Also provided is a handy bibliography.

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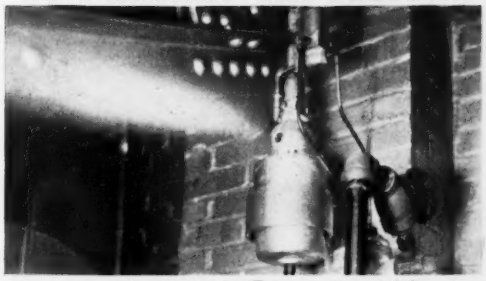

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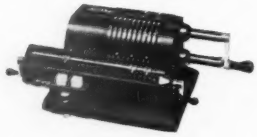

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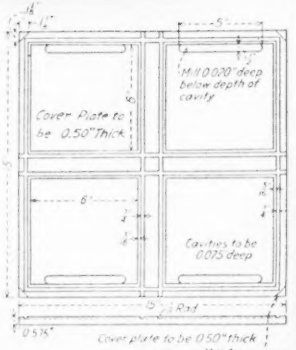
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REVIEWS (CONT'D)

Lightnin Mixers. (Catalog No. B-102). Mixing Equipment Co., 200 Mt. Read Boulevard, Rochester 11, N. Y. 8½ x 11 in. 32 pp.

This new catalog describes turbine-type Lightnin Mixers for open and closed tanks and contains a factual discussion of fluid agitation. It explains how guaranteed fluid agitation results may be obtained for any process and shows how to anticipate process changes by installing a mixer with interchangeable speeds. It also describes how mixing impellers are scientifically selected and sized for specific jobs and how research is used to develop accurate prediction of fluid agitation results. The company's new line of Series E Mixers is fully described.

•

Modern Hydraulic Presses. Hydraulic Press Division, French Oil Mill Machinery Co., Piqua, Ohio. 8½ x 11 in. 28 pp.

The various types of hydraulic presses manufactured by the company for the rubber industry, including new sizes and types produced within the past few years, are described and illustrated in this new bulletin. Brief specifications of each unit are given, including pressures and dimensions of hot plates. The bulletin also includes a table of pressures per square inch of platen area and a ram speed-pipe line flow chart. Additional tabular data of interest to users of hydraulic presses is also included.

•

Bailey Air-Operated Combustion Control. (Bulletin No. 1023). Bailey Meter Co., 1050 Ivanhoe Road, Cleveland 10, Ohio. 8½ x 11 in. 24 pp.

A detailed account of the company's automatic combustion control techniques for oil and gas-fired boilers is given in this bulletin. Illustrations and descriptions include lucid diagrammatics showing nine typical firing methods and 16 major control equipment components. There are also facts and figures on some 300 installations throughout the country, ranging from 6,000 to 1,000,000 lbs./hr. capacity.

•

Pangborn Type CM Cloth Bag Dust Collector. (Bulletin No. 914). Pangborn Corp., Hagerstown, Md. 8½ x 11 in.

Data on the company's new cloth bag dust collector for carbon black, fine wood, pigments, metal oxides and similar dusts is given in this new, two-color bulletin. It tells how the cloth bag collectors work, and how they are installed and maintained. Specifications of standard collector sizes and dimensions are given. The bulletin also describes collector casings, hoppers, hopper valves and structural supports.

Long Flex Life?
SEE PAGE 4

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, APR. 4, 1952

Natural Rubber

There are few in the rubber trade who will express any definite view on the trend of rubber prices in the next few months. Among the factors which cannot be gauged at the moment is the position the government will take in supporting the price of natural rubber. Political uncertainties in the Far East remain an ever-present factor. Currency changes must also be contended with. Consequently, traders must necessarily operate on a day-to-day basis until the picture becomes clarified.

The Indonesian government has reported that effective May 1, an additional small export tax on rubber shipped to the United States will go into effect. This tax ranges from 1¢ downward, with native rubber subject to the higher tax. In addition, another export tax goes into effect in Indonesia as of May 15. This tax is on exports of any and all produce to the United States and amounts to about 1% of the prevailing tax.

Reports from Washington indicate that a further upward revision in the permissible use of natural rubber in the United States may be forthcoming. While this development would be heartening to the rubber trade there is no indication that manufacturers would use anything near all the permissible quantities, considering the rapid strides of the synthetic product. A more favorable price structure for natural as against synthetic might, of course, change this picture.

Revised estimates issued by the International Rubber Study Group show that Indonesian rubber production in 1951 reached a new peak of 800,000 long tons, compared with 692,750 in 1950.

Quotations for the markets in London and Singapore follow:

London Markets

(Standard Smoked Sheets)

May	36.75 - 37.04
July-September	35.00 - 35.25

Singapore Market

(Standard Smoked Sheets)

May	35.15 - 35.26

Domestic Natural Rubber Prices

Grade	Price (per lb.)
Ribbed Smoked Sheets—No. 1	48½¢
No. 2	47¼
No. 3	47
No. 4	45
No. 5	40½
Thin Latex—No. IX	56½
No. 1	55½
No. 2	52½
No. 3	49½
Thick Latex—No. IX	56½
No. 1	55½
No. 2	52½
No. 3	49½
Thin Brown—No. IX	43½
No. 2X	41
No. 3X	36½
No. 1	38½
No. 2	37½
No. 3	36½
No. 4	34½
Blanket (Amber)—No. 2	38½
No. 3	37½
No. 4	36½
Smoked Blanket—No. 1	38½
No. 2	36½
Flat Bark	30½
Beni Bolivian Para	41½
Liquid Latex	62½

Note: These are General Services Administration Prices (plus service charges) for delivery ex G.S.A. shipping points.

Scrap Rubber

The market for scrap rubber continues to be fairly sluggish, a condition which has existed for the past several months. Stocks are said to be ample and calls from reclaimers have been few. At one time it had been said that the production of second-line tires would create a pick-up in demand for scrap rubber but, to date, there has been little indication that these predictions have held. OPS-established prices for scrap rubber follow:

(Prices Delivered Akron)

Mixed tires	ton	$26.00
Mixed beadless tires	ton	34.00
Light colored carcass	ton	130.00
Black carcass	ton	50.00
No. 1 peelings	ton	65.00
No. 2 peelings	ton	42.00
No. 3 peelings	ton	38.00
Buffings	ton	30.00
Truck and Bus S.A.G.	ton	28.00
Passenger S.A.G.	ton	28.00
Mixed S.A.G.	ton	26.00
Light colored tubes	lb.	.16
Natural rubber red tubes	lb.	.16
Natural rubber black tubes	lb.	.11½
Mixed natural rubber tubes	lb.	.10
Butyl rubber tubes	lb.	.057
GR-S rubber tubes	lb.	.02
Mixed synthetic tubes	lb.	.03

Reclaimed Rubber

A fairly strong position characterizes the reclaim market with consumption trends running at good levels. The Department of Commerce, in a final total, has reported reclaim consumption at 346,121 long tons in 1951, as compared with 303,733 long tons in the previous year. Trade sources look for continued demand for the balance of 1952. OPS-established prices for reclaimed rubber are running at or slightly below official ceilings, shown below:

(Prices for All Areas Except Calif.)

Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14½
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.14½
S.P. Natural Rubber Black Tube	.21
Natural Rubber Black Tube	.20
Natural Rubber Red Tube	.24¼
Natural Rubber Gray Tube	.24¼

Cotton Tire Fabrics

Trade sources indicate that the market for cotton tire fabrics has been holding up rather well during the past period. Despite the competition of synthetic fabrics, the cotton tire fabric market has been holding its position due, in great part, to the demands of the rearmament program. It is expected that this general condition will continue for the next few months. Current prices on fabrics and chafers follow:

Standard, Peeler, 12/4/2	lb.	.90
Extra Staple, Peeler, 12/4/2	lb.	.95

Chafers

14.4 oz. (per square yard)	lb.	.86
9.25 oz. (per sq. yard)	lb.	.81½
11.65 oz. (per sq. yard)	lb.	.76
8.9 oz. (per sq. yard)	lb.	.82

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in a range of 1.65c since our last report (March 10), high for the period being 42.70c reached on March 19 and again on April 3, and low being 41.05c reached on March 13. The average price of middling uplands in March was 41.70c based on 24 trading days. This compares with an average of 41.64c in February.

The House Agriculture Committee has approved a bill to boost 1952 cotton support prices about 3½c a pound should the Agriculture Department forecast a 16,000,000 bale crop this year. While this is the Department's announced goal for 1952 production, many officials have doubted that it would be met. If the Department does not forecast a 16,000,000 bale crop, price supports would not be changed under the bill.

The Agriculture Department has announced that it now appears as though 5% more American cotton will be used this season than last. It said demand by domestic users was down, but foreign demand was up. The government agency forecast total use for the year ending August 1, 1952, at 15,500,000 bales—9,500,000 in this country and exports of 6,000,000. The net result, the Department said, would be to cut U. S. reserves to less than 2,278,000 bales, the smallest in 27 years.

The Commodity Credit Corp. has reported that the U. S. has exported 4,535,000 bales through April 1, 1952, against 2,954,000 bales at the same point last year. This means that 1,465,000 bales still remain to be shipped if the anticipated figure of 6,000,000 bales is to be reached by July 31.

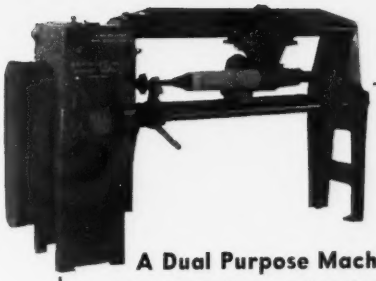
Quotations for middling uplands on the Exchange follow:

	Feb. 5	April 4		
	Close	High	Low	Close
May	39.79	41.61	41.35	41.55
July	38.90	50.65	40.35	40.52
Oct.	36.22	37.67	37.51	37.52

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.465 - .475
Butaprene NL	.475 - .485
Butaprene NAA	.515 - .525
Butaprene NXM	.550 - .560
Chemigum 30N4NS	.400 - .470
Chemigum 50N4NS	.400 - .470
Chemigum N3	.450 - .520
G-E Silicone Rubber (compounded)	3.20 - 4.40
G-E Silicone Gum (not compounded)	—— - 5.00
GR-I	-.2075
GR-S	—— - .260
Hycar OR-15	.580 - .590
Hycar OR-25	.500 - .510
Hycar OS-10	.550 - .560
Neoprene Types CG and AC	—— - .500
Neoprene Type E	—— - .650
Neoprene Types FR and KNR	—— - .800
Neoprene Type GN	—— - .380
Neoprene Type GN-A	—— - .380
Neoprene Type RT	—— - .400
Neoprene Type S	—— - .380
Neoprene Type W	—— - .400
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Silastic (compounded)	2.35 - 4.40
Thiokol Type A	—— - .470
Thiokol Type FA	—— - .640
Thiokol PR-1	—— - .950
Thiokol Type ST	—— -1.000



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CURRENT MARKET PRICES

Of Rubber Chemicals and Compounding Ingredients

APRIL 7, 1952

Prices are, in general, f.o.b. works. Range of prices indicates grade or quantity variations.

Abbreviations: bbls., barrels; c.l., carlot; cyl., cylinder; dlvd., delivered; dms., drums; l.c.l., less than carlot; M.B., masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

***For Export Only**

The arrangement of this section closely follows the Chemical Section of the 1951-52 RUBBER RED BOOK. Readers are referred to the RUBBER RED BOOK for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)	lb.	.48	.55
A-32	lb.	.59	.69
A-77	lb.	.47	.60
A-100	lb.	.47	.60
Accelerator No. 8	lb.	—	.98
Accelerator—49	lb.	.48	.49
Accelerator—552	lb.	—	2.00
Accelerator—808	lb.	.59	.61
Accelerator—833	lb.	1.13	1.15
Altax	lb.	.42	.44
Ancap*	lb.	.34	.36
Ancatax*	lb.	.42	.44
Ancazate* BU (ET & ME)	lb.	—	1.00
Ancazide* ET	lb.	—	1.00
ME	lb.	—	1.10
Arazate	lb.	—	2.16
Beutene	lb.	.59	.61
Bismate, Rodform	lb.	—	3.00
Butasan	lb.	—	1.00
Butazate	lb.	—	1.00
Butyl Eight	lb.	1.00	1.15
Captax	lb.	.34	.36
C-P-B	lb.	—	1.95
Cumate, Rodform	lb.	—	1.45
Dibenzo G.M.F.	lb.	—	2.50
Diorthotolylguanidine	lb.	.52	.53
Diphenylguanidine	lb.	.43	.44
El Sixty	lb.	.45	.52
Ethasan	lb.	—	1.00
Ethazate	lb.	—	1.00
Ethex	lb.	—	1.00
Ethyl Thiurad	lb.	—	1.00
Ethyl Tuex	lb.	—	1.00
Ethylac	lb.	.88	.90
G-M-F	lb.	—	2.50
Good-rite Erie	lb.	.35	.37
Guantal	lb.	.55	.62
Harvex	lb.	.52	.57
Hepteen	lb.	.42	.44
Base	lb.	1.80	1.85
Ledate, Rodform	lb.	—	1.00
Mercaptobenzothiazole	lb.	.34	.36
Mercaptobenzothiazyl Disulfide	lb.	.42	.44
Mertax	lb.	.50	.52
Methasan	lb.	—	1.00
Methazate	lb.	—	1.00
Monex	lb.	—	1.10
Mono Thiurad	lb.	—	1.10
Morfex	lb.	.59	.61
2-MT	lb.	—	.75
NA-22 (for neoprene)	lb.	—	1.50
O-X-A-F	lb.	.43	.45
Pentex	lb.	—	1.00
Flour	lb.	—	.20
Permalux (for neoprene)	lb.	—	2.10
Phenex	lb.	.49	.54
Pip-Pip	lb.	—	2.25
R-2 Crystals	lb.	—	2.20
Retax	lb.	.44	.46
RZ-50	lb.	—	1.00
SA-52	lb.	—	1.10
SA-57	lb.	—	1.00
SA-62	lb.	—	1.00
SA-66	lb.	—	1.45
SA-67	lb.	—	1.00
SA-77	lb.	—	1.00
Safex	lb.	—	1.15
Santocure	lb.	.68	.75
Selazate	lb.	—	1.45
Selenac (Ethyl, Methyl)	lb.	—	1.45
Setsit-5	lb.	.75	1.05
SPDX-GH (tons)	lb.	.64	.69
-GL	lb.	—	.95
Tellurac	lb.	—	1.45
Tepidone	lb.	—	.55
Tetrone A	lb.	—	1.85
Thiotide	lb.	.42	.49
-N	lb.	.31½	.33½
Thionex	lb.	—	1.10
Thiotax	lb.	.34	.41
Thiurad	lb.	—	1.10
Thiuram E	lb.	—	1.00
M	lb.	—	1.10
Trimene	lb.	.54	.56
Base	lb.	1.03	1.06
Tuads, Ethyl	lb.	—	1.00
Tuads, Methyl	lb.	—	1.10
Tuex	lb.	—	1.10
Ultex	lb.	1.00	1.05
Unads	lb.	—	1.10
Ureka Base	lb.	.66	.73
Vitasan Crystals	lb.	.48	.53
Vulcacure NB	lb.	—	.45
-3B	lb.	—	.85
-3E	lb.	—	.85
-2M	lb.	—	.85
Z-B-X	lb.	—	2.45
Zenite	lb.	.42	.44
-A	lb.	.50	.52
Zenite Special	lb.	.43	.45
Zetax (uncoated)	lb.	.43	.45
Zimate, Butyl	lb.	—	1.00
Zimate, Ethyl	lb.	—	1.00
Zimate, Methyl	lb.	—	1.00

ACTIVATORS

Blue Lead, Sublimed (dlvd.)	lb.	.13¼	.14¼
Fish Oil, Hydrogenated, Fatty Acid			
Hydrofol Acid (dlvd.)	lb.	.10	.14½
Hyfac 430 (dlvd.)	lb.	.17	.18¼
Neo-Fat H.F.O. (dlvd.)	lb.	.14½	.15¾
Stearex Beads (dlvd.)	lb.	.12	.13¼
Lime, Hydrated			
Arrowhead	ton	—	20.65
Marblehead	ton	—	18.00
Sierra	ton	—	19.50
Litharge			
Eagle (dlvd.)	lb.	—	.2165
ESB (dlvd.)	lb.	—	.2255
Magnesium Oxide, Heavy			
General Magnesite 500	lb.	.05	.06½
600	lb.	.06	.08
Michigan No. 15	lb.	.0550	.0600
Permanente	lb.	.05	.06½
Magnesium Oxide, Light			
Baker's (Neoprene Grade)	lb.	—	.31
General Magnesite (Neoprene Grade)	lb.	—	.30
General Magnesite No. 101	lb.	—	.19
General Magnesite Standard	lb.	—	.22
K & M (Neoprene Grade)	lb.	.30	.31
Maglite D	lb.	—	.25
M	lb.	—	.31
Marine's (Neoprene Grade) (l.c.l.)	lb.	—	.31
Michigan No. 30	lb.	—	.24
No. 40 Extra Light	lb.	—	.31
Witco Extra Light	lb.	.32	.35
Oleic Acid			
Emersol 210 (dlvd.)	lb.	.10¾	.13¾
L.C.P. Red Oil	lb.	.10¾	.13½

ACTIVATORS (Cont'd)

Palm Oil Fatty Acid (c.l.)	lb.	.11½	.14½
Potassium Oleate (drums)	lb.	.45	.55
Red Lead			
Eagle	lb.	—	.2257
No. 2 RM (dlvd.)	lb.	—	.2282
Sodium Laurate, 75%	lb.	.64	.74
Sodium Oleate, 75%	lb.	.45	.55
Paste (drums)	lb.	—	.20
Sodium Stearate, 75%	lb.	.45	.55
USP Grade (drums)	lb.	—	.37
Stearic Acid, Single Pressed			
Emersol 110 (dlvd.)	lb.	.10½	.13¾
Groco 53	lb.	.10½	.13¾
Stearex B (dlvd.)	lb.	.15½	.16¾
Stearic Acid, Double Pressed			
Groco 54	lb.	.11	.12½
Stearic Acid, Other			
Neo-Fat 1-58	lb.	.1190	.1315
1-60	lb.	.1400	.1525
1-65	lb.	.1450	.1575
White Lead Basic Carbonate	lb.	.2010	.2110
White Lead Basic Sulfate	lb.	.1919	.2019
Zinc Laurate			
Laurex	lb.	.29	.30
Zinc Stearate			
Aquazinc	lb.	.20	.35

Unclassified Activators

Actifat (dms.)	lb.	—	.18
Aktone	lb.	.22	.23
Barak	lb.	—	.60
Curade	lb.	.57	.59
D-B-A	lb.	—	1.95
Dibutylamine (dlvd.)	lb.	.53	.55¾
MODX	lb.	.295	.345
Polyac	lb.	—	1.60
Ridacto (drums)	lb.	.25	.26
Stodelte (dlvd.)	lb.	.15	.16½
SOAC (min. 10 dms.) cwt.		—	8.00
Vulklor	lb.	.75	.85

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	lb.	.17	.21
Aqua Ammonia (dms.)	lb.	.031	.035
M.B.M. (l.c.l.)	lb.	—	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H	lb.	—	.20
Regular	lb.	—	.12
D.C. Antifoam A	lb.	5.65	6.65
Antifoam A Emulsion	lb.	2.30	4.00
Defoamer A-25	lb.	—	3.00
Deltyl Prime	lb.	.70	.82
Defoamer 630	lb.	—	.12½
Kessco X-3 (dms.)	lb.	—	.47½
Modicol A	lb.	.12	.15
B	lb.	.35	.40
RS-968	lb.	.38	.38½
Terpinol Prime No. 1	lb.	.39	.54

ANTI-OXIDANTS

Agebest 1293-22A	lb.	1.90	2.00
Agerite Alba	lb.	2.20	2.30
Gel	lb.	.60	.62
Hipar	lb.	.91	.93
H. P.	lb.	.67	.69
Powder	lb.	.49	.51
Resin	lb.	.65	.67
Resin D	lb.	.49	.51
Stalite	lb.	.49	.51
White	lb.	1.40	1.50
Akroflex C	lb.	.67	.69
F	lb.	.67	.69
Aminox	lb.	.49	.51
Antioxidant 2246	lb.	1.60	1.63
Antox	lb.	.49	.51
Aranox	lb.	—	3.25
Benzoquinone	lb.	1.50	1.75
Betanox Special	lb.	.70	.72
B-L-E	lb.	.49	.51
Carvacrol	lb.	—	.78
Deenax	lb.	.95	1.05
Di-tert Butyl-para Cresol	lb.	.91	.95
Eugenol C-95%	lb.	3.34	3.54
Flectol H	lb.	.49	.56
Flexamine	lb.	.67	.69
Neozone A	lb.	.51	.53
C	lb.	—	.67
D	lb.	.49	.51

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ANTI-OXIDANTS (Cont'd)

Oxidex	lb.	——	3.60
PDA-10 and 20	lb.	.39	.41
Permalux	lb.	——	2.10
Resorcin, Tech. (dlvd.)	lb.	.82½	.83½
Santoflex AW	lb.	.75	.82
B	lb.	.49	.56
BX	lb.	.60	.67
35	lb.	.67	.74
Santovar-A	lb.	1.50	1.57
O	lb.	1.30	1.37
Santowhite Crystals	lb.	1.55	1.62
Santowhite L	lb.	.49	.56
MK	lb.	1.25	1.32
S.C.R. (tons)	lb.	.32	.34
Sequestrene AA	lb.	——	1.00
NA2	lb.	——	.82
NA3	lb.	——	.80
Stabilite	lb.	.53	.55
Alba	lb.	.72	.77
L	lb.	.53	.55
White	lb.	.49	.51
Stabilizer No. 1	lb.	——	1.55
Stabilizer No. 9A	lb.	.80	1.05
Sunolite	lb.	.20	.23
Tannic Acid, Tech.	lb.	.46	.48
Thermoflex A	lb.	.98	1.00
V-G-B	lb.	.65	.67
Wing-Stay S	lb.	.48	.49

ANTI-SCORCHING AGENTS

Armeen HT	lb.	.34	.42
Benzoic Acid—Tech.	lb.	——	.43
Good-rite Vultrol	lb.	.58	.60
Sodium Acetate 60-62% Crystals	lb.	——	.06

ANTISEPTICS AND GERMICIDES

Arquad S	lb.	.22	.25
Formaldehyde (dms.)	lb.	.066	.071
G-4 (bbls.)	lb.	1.04	1.19
G-11	lb.	2.60	2.75
Nuodex 100 S.S. (dlvd.)	lb.	——	1.10
Nuodex 100 W.D. (dlvd.)	lb.	——	1.25
Nuodex Zinc 8% (dms.) (dlvd.)	lb.	.24	.28
Ortho Cresol (26°-27°)	lb.	——	.201
Retarder D	lb.	.42	.50
Soligen Drier—Copper 8% (dms.)	lb.	.23½	.24¾
Copper 6% (dms.)	lb.	.18¾	.19½
Zinc 8% (dms.)	lb.	.22¼	.23½
Zinc 8% (dms.)	lb.	——	.21¼
Vancide	lb.	——	.80

ANTI-WEBBING AGENTS (for Latex)

Webnix 33	lb.	1.50	2.25
34	lb.	1.75	2.25

AROMATICS (DEODORANTS)

Alamasks	lb.	.50	6.50
Bouquet 149	lb.	——	3.00
Coumarin	lb.	——	2.75
Curodex 19	lb.	——	4.75
188	lb.	——	5.75
198	lb.	——	6.75
Deodorant 65	lb.	——	1.00
Deodorant L-37	lb.	2.00	2.40
L-44	lb.	2.50	2.90
N.L.T.X.	lb.	1.85	2.15
Deodorant Oil GD 3427	lb.	1.70	2.00
GD 6422	lb.	2.00	2.50
GD 6423	lb.	1.60	1.90
GD 6575	lb.	2.45	2.95
GD 31063	lb.	2.65	3.15
Latex Perfume 5	lb.	——	3.25
6	lb.	——	7.50
9	lb.	——	.65
Naugaromes (dms.)	lb.	1.50	3.00
Neutroleum Delta	lb.	——	2.60
Gamma	lb.	——	2.60
Parador A	lb.	1.95	2.25
C	lb.	2.75	3.25
E	lb.	.25	.55
GD 5280	lb.	2.00	2.50
GD 5348	lb.	1.90	3.25
Perfume Oil Bouquet Vanilla M	lb.	2.40	2.75
Rodo No. 0	lb.	4.00	4.50
No. 10	lb.	5.00	5.50
Rubbarome (dms.)	lb.	1.00	3.80
Rubber Perfume 12	lb.	——	2.85
Russian Leather 7	lb.	——	4.10
Vanillin	lb.	3.00	4.05

BLOWING AGENTS

Ammonium Bicarbonate (dlvd.)	lb.	.0725	.1075
Blowing Agent CP-975	lb.	——	.35
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	——	2.10
Sponge Paste	lb.	——	.20
Unicel	lb.	——	.82
ND	lb.	——	1.40
S	lb.	——	.20
Urea	lb.	.0425	.0475

BONDING AGENTS

Braze	gal.	6.00	7.50
Durez 12987	lb.	.48	.53
MDI	lb.	5.00	5.50
50	lb.	2.75	3.25
Penacolite B1A	lb.	——	.88
Phlobond 20	gal.	2.91	4.23
30	gal.	3.65	4.97

BONDING AGENTS (Cont'd)

Reanite	gal.	6.75	7.25
Rex Compounds	gal.	1.30	2.85
Ty-Ply Q (BN & S)	gal.	6.75	8.00

COAGULANTS

Acetic Acid—36% (bbls.)	cwt.	9.00	11.00
Glacial—99½% (bbls.)	cwt.	14.05	14.55
Calcium Nitrate, Tech., Crystals	lb.	.07	.17
Hydroxyacetic Acid—70% (dms.)	lb.	——	.084
Zinc Nitrate, Tech.	lb.	——	.22½

COLORING AGENTS

Black

Aquablak B (also M, R)	lb.	.08	.11¾
Aquablak S	lb.	.11	.11½
Black Shield 4-35 (dms.)	lb.	——	.0825
Carbon Black—See *Reinforcing Agents*			
Lampblack No. 10	lb.	.06	.09
Mapico Black Iron Oxide (50 lb. bags)		.11¾	.12
Pure Black Iron Oxide	cwt.	11.75	12.00

Blue

Blue GD, Dispersed	lb.	——	4.55
Blue GD Paste	lb.	——	1.80
Midori Blue	lb.	.43	.48
Monastral Fast Blue CPL	lb.	——	1.77
PCD, Dispersed	lb.	——	2.50
Ramapo Blue	lb.	3.40	3.45
Rubber Blue X-1999	lb.	——	1.70
Stan-Tone Blue	lb.	1.40	4.00
Ultramarine	lb.	.14	.30
Vansul Blue M.B.	lb.	.90	2.65
Victoria Blue BP-262-D	lb.	2.25	2.30

Brown

Brown Iron Oxide	lb.	.11¾	.12
Mapico Brown (50 lb. bags)	lb.	.12¾	.13

Green

Filo Green	lb.	——	.32
Green Chromium Oxide, C. P. Pure	lb.	.37½	.44½
Green Chromium Oxide, Pure, Hydrated	lb.	.95	1.05
Green FD, Dispersed	lb.	——	1.85
Monastral Fast Green GSD, Dispersed	lb.	——	3.20
GSL	lb.	——	1.97
Permansa Green CP-594	lb.	——	1.35
Pigment Green B	lb.	——	1.35
GL-652D	lb.	.88	.93
Ramapo Green	lb.	——	4.00
Rubber Green X-1292	lb.	——	1.15
Stan-Tone Green	lb.	1.50	3.30
Vansul Green M.B.	lb.	1.05	3.05

Maroon

Stan-Tone Maroon	lb.	3.00	3.05
Vansul Maroon M.B.	lb.	1.05	2.80

Orange

Molybdate Orange	lb.	——	.45
Orange FD, Dispersed	lb.	——	2.75
Rubber Orange X-2065	lb.	——	3.00
Stan-Tone Orange	lb.	1.65	4.00
Vansul Orange M.B.	lb.	2.25	2.60

Red

Antimony Trisulfide	lb.	.72	.78
R. M. P. Sulfur Free	lb.	——	.78
R. M. P. No. 3	lb.	——	.72
Cadmium Red	lb.	.95	1.25
Cadmolith Red (bbls.)	lb.	1.75	2.00
Graphic Red (dlvd.)	lb.	——	.85
Indian Red, American, Pure	lb.	.12¾	.12½
Dexco (English)	lb.	.11½	.11¾
Mapico Reds (50 lb. bags)	lb.	.1225	.1250
Oximony Iron Oxide	lb.	——	.09
Red Iron Oxide, Light	lb.	.12¼	.12½
Red PBD, Dispersed	lb.	——	1.75
2BD, Dispersed	lb.	——	1.80
2BL	lb.	——	1.32
PBL	lb.	——	1.65
Rubanox Red CP-762 (dlvd.)	lb.	——	1.40
Rubber Red CP-339 (dlvd.)	lb.	——	1.10
Rubber Red RT-364	lb.	——	.75
Rubber Red RT-425	lb.	——	.75
Rubber Red X-1148	lb.	——	.85
Rubbered	lb.	.1150	.1175
Solfast Red	lb.	1.40	1.95
Stan-Tone Red	lb.	1.10	3.05
Sun Burnt Red	lb.	.1150	.1175
Vansul Red M.B.	lb.	.95	3.40
Watchung Red	lb.	——	1.95

White—Lithopone

Albalith	lb.	.0790	.0890
Cryptone BT	lb.	.10	.11
Eagle	lb.	.06¼	.06½
Permolith	lb.	.0790	.0890
Penolith	lb.	.0790	.0865
Sunolith	lb.	.0790	.0865

COLORING AGENTS (Cont'd)

White—Titanium Pigments

Ti-Cal	lb.	.08	.08¼
Ti-Pure	lb.	.21	.24
Titanox A—all grades (dlvd.)	lb.	.21	.22
RA (dlvd.)	lb.	.23	.24
RA-10 (dlvd.)	lb.	.23	.24
RA-NC (dlvd.)	lb.	.23	.24
RC (dlvd.)	lb.	.08¼	.08¾
RC-HT (dlvd.)	lb.	.08	.08½
Unitane O-220	lb.	.195	.205
OR-250	lb.	.215	.225
Zopaque	lb.	.21	.22

White—Zinc Oxide (American Process)

AZO-ZZZ 11 (and 22, 33, 44, 55)	lb.	.1760	.1860
Eagle	lb.	.1760	.1860
Horse Head Special	lb.	.1760	.1860
XX Red	lb.	.1760	.1860
XX-505	lb.	.1910	.2010
Protox 166	lb.	.1760	.1860
167	lb.	.1760	.1860
St. Joe Black Label	lb.	.1760	.1860
Green Label	lb.	.1760	.1860
Red Label	lb.	.1760	.1860

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	——	13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1985	.2085
Eagle Green Seal	lb.	.1935	.2035
Eagle Red Seal	lb.	.1885	.1985
Eagle White Seal	lb.	.1985	.2085
Florence Green Seal	lb.	.1935	.2035
Red Seal	lb.	.1885	.1985
White Seal	lb.	.1985	.2085
Kadox 25	lb.	.1985	.2085
Kadox 15, 17 and 72	lb.	.1760	.1860
U. S. P. 32	lb.	.2085	.2185

White—Zinc Sulfide

Cryptone ZS 800	lb.	.2530	.2630

Yellow

Benzidine Yellow	lb.	1.91	2.15
Cadmolith Yellow (bbls.)	lb.	——	1.27
Chrome Yellow	lb.	——	.32
Iron Oxide, Pure	lb.	.10	.10¼
Mapico Yellow (50 lb. bags)	lb.	.1000	.1025
Rubber Yellow X-1940	lb.	——	2.15
Stan-Tone Yellow	lb.	1.00	2.25
Toluidine Yellow	lb.	——	1.91
YL-556-D	lb.	——	.82
Oximony Iron Oxide	lb.	——	.06½
Vansul Yellow M.B.	lb.	1.05	1.85
Yellow GD, Dispersed	lb.	——	2.15
GL	lb.	——	1.62
Zinc Yellow	lb.	——	.27

DISPERSING AGENTS

Anchoid*	lb.	.24	.25
Armeen 18	lb.	.42	.50
Blancol Conc. Powder	lb.	.15½	.17½
Darvan No. 1 (and No. 2)	lb.	.23	.30
Daxad 11 (21, 23)	lb.	.08	.35
Dispersaid	lb.	1.25	1.35
Furala	lb.	.06½	.07½
Halloid	lb.	.04½	.05½
Lomar PW	lb.	——	.16
Marasperse C	lb.	.06½	.06¾
CB	lb.	.12¼	.13¾
N	lb.	.09½	.10½
Modicol C	lb.	.08	.12
Rubbex	lb.	.267	.285
Stan-Chem BQC	lb.	.12¼	.17¼
1067	lb.	——	.13½
1471	lb.	.1687	.2187
2251	lb.	.12¼	.17¼
Trenamine D-25	lb.	.32½	.36
Triethanolamine (drums) (dlvd.)	lb.	.24½	.27½
Yelkin TT	lb.	.14	.18
Zinsper	lb.	——	.15

EXTENDERS

Advagum 1098	lb.	——	.64
Arreco 1071-13B	lb.	.14½	.15½
1073-18B	lb.	.13½	.14½
1294-36B	lb.	.11½	.12½
Bunaweld Polymer No. 780	lb.	——	.22
No. 5514	lb.	——	.35
D-92 (and D-93) (dms.)	lb.	——	.12
Extender 600	lb.	——	.1480
Polyco 418	lb.	.17	.18
PR-162 Latex Extender	gal.	——	1.55
Symprolac	lb.	.16	.23
Synprowax	lb.	——	.23
Vistanex	lb.	——	.32

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Abrasives			
Carbonite	lb.	.19½	1.30
Lionite	lb.	.14	1.20
Pumice	lb.	.03	.05
Aluminum Hydrate	lb.	.07	.10
Aluminum Silicate			
Marter White	ton	18.50	30.00
Barium Carbonate (l.c.l.)	ton	72.50	90.00
Barytes			
No. 1 Floated, White	ton	37.85	53.60
No. 2 Floated, Unbleached	ton	35.85	51.60
No. 22 Barytes (c.l.)	ton	——	20.00
Foam A	ton	——	37.60
Bentonite (c.l.)	ton	——	12.50
Argosite Clay (c.l.)	ton	——	12.50
Bennett Clay (c.l.)	ton	——	32.50
SPV Volclay (c.l.)	ton	——	12.50
Blanc Fixe	ton	72.50	120.00
Calcium Carbonate			
Atomite (c.l.)	ton	——	30.00
B.I. White No. 1 (c.l.)	ton	——	7.50
B.I. White No. 2 (c.l.)	ton	——	7.00
Blue Star XX	ton	——	15.50
Calcene TM	ton	75.00	95.00
Calitec	ton	40.00	57.50
Calwhite	ton	——	17.00
Camelwite	ton	——	30.00
Gamaco	ton	——	30.00
Kalite (c.l.)	ton	——	50.00
Laminar	ton	——	30.00
Lesamite (c.l.)	ton	——	27.50
Millical (c.l.)	ton	——	32.50
Multifex	ton	——	120.00
M	ton	——	110.00
Non-Fer-Al	ton	——	25.00
Purecal D	ton	51.75	66.75
M	ton	46.50	66.75
T	ton	110.00	125.00
U	ton	120.00	135.00
Sierracal	ton	15.00	18.50
Super Multifex	ton	——	160.00
Surfex (c.l.)	ton	——	35.00
Suspenso (c.l.)	ton	——	30.00
Witcarb B	ton	51.75	66.75
P	ton	110.00	125.00
R	ton	120.00	135.00
R-12	ton	46.50	66.75
York White	ton	——	9.50
Calcium Silicate			
Silene EF	ton	120.00	140.00
Calcium Sulfate, Anhydrous			
Snow White Filler	ton	——	20.50
Calcium Sulfate, Hydrous			
Terra Alba No. 1	ton	12.00	14.40
Chalk Whiting (l.c.l.)	lb.	.0150	.0175
Recco Paris Whiting	ton	——	33.00
Clay			
Alsilite (c.l.)	ton	20.00	45.00
Alsite (c.l.)	ton	——	14.00
Aluminum Flake	ton	17.00	60.00
A.S.P. No. 1 (c.l.)	ton	——	35.00
No. 11 (c.l.)	ton	——	40.00
Buca (c.l.)	ton	——	45.00
Burgess No. 20	ton	——	35.00
No. 30	ton	——	37.00
Burgess Iceberg	ton	——	50.00
Burgess Polyclay	ton	——	45.00
Catalpo (c.l.)	ton	——	35.00
Champion	ton	——	14.00
C.S.D. (c.l.)	ton	——	13.50
Crown	ton	——	14.00
Dixie (c.l.)	ton	——	14.00
Hi-White R	ton	——	13.50
Hydratex R	ton	——	30.00
Kaolloid Clay (c.l.)	ton	——	10.50
Markham (c.l.)	ton	14.00	35.00
McNamee (c.l.)	ton	——	13.50
Oldham (c.l.)	ton	13.50	35.00
Paragon	ton	——	13.50
Pigment 5	ton	21.85	36.00
Pigment 22	ton	17.00	22.50
Pigment 33	ton	——	37.00
Recco (c.l.)	ton	——	14.00
RX-43	ton	——	33.00
Stan-Clay	ton	25.00	30.00
Stellar-R	ton	——	50.00
Suprex	ton	——	14.00
Whitetex (c.l.)	ton	——	50.00
Diatomaceous Earth	ton	30.00	50.00
Kaylorite (c.l.)	ton	——	30.00
Lorite	ton	——	30.00
Flock			
Cotton, white and colored	lb.	.13	.33
Filfloc F 40-9000	lb.	——	.16
Filfloc F 6000	lb.	——	.40
Polycel	ton	110.00	210.00
Rayon, bleached or dyed	lb.	.87	1.50
Rayon, grey	lb.	——	.18
Rayon, pink	lb.	——	.18
Solka-Floc (l.c.l.)	lb.	.07	.16
Wool, bleached or dyed	lb.	.70	1.00
Glue, Bone (dlvd.)	lb.	.18	.20½
Leather, Shredded	lb.	.05	.17
Lignin	lb.	.03	.06
Indulin	lb.	.09	.10
Limestone, Pulverized	ton	3.25	10.00
Georgia Marble No. 10	ton	——	10.00
Industrial Filler No. 100	ton	——	5.75
Micro Velva	ton	45.00	48.00
Velvet Filler, Superfine	ton	——	27.00
Magnesium Carbonate	lb.	.0950	.1050
K & M Clearcarb	lb.	.1225	.1275
Magnesium Oxide	lb.	.05	.06

FILLERS (Cont'd)

Magnesium Silicate	ton	18.00	35.00
Airex	ton	25.00	27.00
Asbestol	ton	——	25.00
Blue Star Talc	ton	——	23.00
L.S. Silver	ton	23.50	25.50
Sierra White	ton	21.25	23.25
Mica	lb.	.01¼	.07¾
Concord	lb.	.07	.07¾
Micro-Mica	lb.	.06¾	.07½
Mineralite (c.l.)	ton	25.00	85.00
Silversheen	lb.	.07¼	.08
Triple A Mica (c.l.)	ton	——	25.00
Vermiculite	lb.	——	.11
Wet Ground Biotite Mica	lb.	.05½	.06¼
Wet Ground Mica No. 160	lb.	.07	.07¾
Pyrophyllite			
Pyrax A (c.l.)	ton	——	13.50
WA (c.l.)	ton	——	16.00
Silica	ton	16.00	27.00
Blue Star	ton	——	20.60
Slate, Powdered (l.c.l.)	ton	15.00	20.00
Talc, Domestic	ton	10.00	27.00
Nytal 200	ton	——	25.00
300	ton	——	36.00
Walnut Shell Flour	ton	45.00	111.00
Whiting, Commercial	ton	——	7.00
Camel-Carb	ton	——	10.00
C-C-O White	ton	——	18.00
Georgia Marble No. 15	ton	——	15.00
No. 16	ton	——	16.00
Keystone (c.l.)	ton	——	16.00
Rambo No. 1 White	ton	——	8.50
No. 6 White	ton	——	9.00
Snowflake (c.l.)	ton	——	18.00
Veroc (c.l.)	ton	——	8.50
Welco (c.l.)	ton	——	8.50
York White R (c.l.)	ton	——	8.50
Wood Flour	ton	22.00	49.00

FINISHING MATERIALS, SURFACE

Beaco Finishes	gal.	2.10	2.35
Black Out	gal.	4.50	8.00
Shellac, Orange Gum	lb.	.40	.45
VanWax	gal.	1.45	1.50

FLAME RETARDANTS

Cellutlux	lb.	.36½	.38½
Chlorinated Paraffin 42	lb.	——	.14¼
Chlorowax 70	lb.	.18	.19
Halowax	lb.	.27	.42
Zinc Borate 3167	lb.	.1920	.2020
Zytrox	lb.	.49	.78

LUBRICANTS, MOLD

Aquadag	lb.	3.50	4.00
Aquarex D	lb.	——	.80
L	lb.	——	.94
MDL	lb.	——	.33
WAQ	lb.	——	.28
Akro Gel	lb.	——	.165
Borax, Granular (l.c.l.)	ton	81.00	86.00
Carbowax 4000	lb.	.33	.34
Colite Concentrate (dms.)	gal.	——	.90
Concentrex	lb.	——	.25
D.C. 7 Compound	lb.	5.25	6.50
D.C. Emulsion No. 7	lb.	1.90	2.32
No. 35	lb.	1.59	3.50
No. 35A	lb.	1.59	3.50
No. 35B	lb.	1.59	3.50
D.C. Mold Release Fluid	lb.	3.70	6.00
Dipex	lb.	.14	.18
Dri-Lube	lb.	——	.22
Glydag	lb.	1.30	2.00
Hawkeye Flake (dlvd.)	lb.	——	.11
Kokobace	lb.	——	.12
Lubrex	lb.	.25	.30
Lubri-Flo	gal.	10.00	12.00
Migralube	lb.	——	.35
Mold Lubricant No. 72 Conc.	gal.	2.50	4.00
No. 735	gal.	1.26	2.75
No. 769	gal.	1.20	2.60
Moldeze No. 3	gal.	5.00	6.00
Mold-Brite	gal.	——	1.50
Mold-Slick	lb.	.253	.271
Mold-White	gal.	——	2.00
Monopole Oil MD	lb.	——	.23
Nopcolube	lb.	——	.15
Oryus WA Paste (dms.)	lb.	——	.26
Prodag	lb.	.28	.42
Purity Flake (dlvd.)	lb.	——	.13
Rubber-Flo	gal.	1.25	1.60
Rubber-Glo	gal.	——	.94
Rusco Mold Paste	lb.	——	.25
Sericite (l.c.l.)	ton	65.00	75.00
Thermalube	lb.	——	.13¾
Ucon Lubricants	lb.	.28	.37
Ulco Mold Soap	lb.	.12	.23

LUBRICANTS, RUBBER

Diglycol Stearate Neutral (and SE) (dms.)	lb.	——	.25
Extrud-o-Lube	gal.	——	1.84
G.B. Naphthenic Neutrals	gal.	.11	.18
Latex-Lube GR (dlvd.)	lb.	.19¼	.20
Pigmented (dlvd.)	lb.	.18¼	.19¼
RS	lb.	——	.16½
Liqui-Lube (dlvd.)	lb.	——	.16¼
NF (dlvd.)	lb.	——	.16¾
NT (dlvd.)	lb.	——	.16¼
Propylene Stearate (dms.)	lb.	.68	.78

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.37	.39
Calcium Stearate	lb.	.35	.37
D.C. 4 Compound	lb.	5.13	6.50
D.C. 200 Fluid	lb.	5.70	6.00
Glycerized Lubricant	gal.	——	1.48
Hydro-Zinc	lb.	——	.20
Polyethylene Glycol	lb.	.26½	.29
Rexanol	lb.	——	.13
Separex	lb.	——	.25
Stock-Lube	lb.	——	.19
Slab-Dip	lb.	——	.15
Wet-Zinc	lb.	——	.22¼
Zinc Stearate	lb.	.37	.39
Z.S.D. Dispersion	lb.	——	.20

MOLD CLEANERS

Actusol (dlvd.)	gal.	1.45	1.65
Alkon (dlvd.)	lb.	.16	.16½
Metso 99	cwt.	4.00	5.85
Granular	cwt.	3.50	5.15
Rubber-Sol	gal.	2.97	3.97
Sheiblast	ton	80.00	140.00
Sprex A.C. (dlvd.)	lb.	.17¼	.18¼

PEPTIZING AGENTS

Peptizer P-12	lb.	.84	1.00
Pepton 22	lb.	.72	.75
RPA 2	lb.	——	.75
3	lb.	——	.46
3-RO	lb.	——	.49
5	lb.	——	.57

PLASTICIZERS & SOFTENERS

AA (dms.)	lb.	.30	.30½
Acto 500	lb.	——	.09
Adipol BCA (dms.)	lb.	.45½	.46
2EH	lb.	.47½	.48½
10A	lb.	.47½	.48½
ODA	lb.	.51¼	.52¾
American Pine Tar	lb.	.0410	.0655
Arneel	lb.	.22	.27
Arolene 1980 (c.l.)	lb.	——	.10
Aromatic Tar	gal.	.0573	.1973
Bardol	lb.	.02½	.03½
B	lb.	.05¾	.06
Bayol D	gal.	——	.382
E	gal.	——	.52
Beeswax, Bleached	lb.	.85	.90
Yellow Refined	lb.	.70	.75
Bondogen	lb.	.55	.60
B.R.C. No. 20	lb.	.0150	.0160
B.R.H. 2	lb.	.0280	.0290
BRS 700	lb.	.0175	.0260
B.R.T. 3	lb.	.024	.045
4	lb.	.0225	.0235
7	lb.	.0265	.0275
B.R.V.	lb.	.0350	.0515
Bunarex Resins	lb.	.06½	.07½
Bunatak AH	lb.	.08	.09
U	lb.	——	.17½
No. 90	lb.	——	.09
No. 210	lb.	——	.14
Burgundy Pitch	lb.	.0843	.0888
Butac	lb.	.10½	.11½
Butoxyethyl Diglycol Carbonate	lb.	.40	.41
Butyl Benzyl Sebacate	lb.	.61	.63¼
Butyl Carbitol Perlargonate (dms.)	lb.	——	.64
Butyl Cellosolve Perlargonate (dms.)	lb.	——	.68
Butyl Palmitate	lb.	——	.26¾
Butyl Roleate	lb.	.176	.18
Butyl Stearate-CP (dms.)	lb.	.31	.32
BWH-1	lb.	——	.14
Cabflex Di-BA (dms.)	lb.	.42	.44¼
Di-OA (dms.)	lb.	.43½	.46¼
Di-OP (dms.)	lb.	.40	.42½
Califlux 510, 550	lb.	.025	.0325
G.P.	lb.	.0125	.02
R-100	lb.	.04½	.05¼
TT	lb.	.02	.02¾
Candelilla Wax Prime	lb.	.67	.75
Capryl Benzyl Sebacate	lb.	.67½	.70¼
Carbonex	lb.	.0325	.0375
S Flakes	lb.	.04	.0475
S Plastic	lb.	.0410	.0460
644	lb.	.0375	.0425
Carbowax 4000 (drums)	lb.	.33	.34
Cardolite 615	lb.	.33¾	.36¼
816	lb.	.25¾	.28¼
Carnauba Wax, Crude	lb.	.95	1.10
Refined	lb.	.87	.94
Substitute	lb.	.85	1.08
Yellow	lb.	1.15	1.20
Celluflex (dms.)	lb.	.34	.35
Ceresine Wax	lb.	1.4	.26
Chlorowax 40	lb.	.16	.17
Contogum	lb.	.06¾	.10¾
CTLA Polymer	gal.	.17½	.32½
Cumar Resins	lb.	.05½	.14½
D.C. 200 Fluid	lb.	4.14	6.00
D.B.M.	lb.	——	.30
Degras, Common	lb.	——	.12
Dibenzyl Sebacate	lb.	.74	.76¼
Dibutoxethyl Sebacate	lb.	——	.5634
Dibutyl Phthalate	lb.	.36	.41¼
Dibutyl Sebacate—Tech.	lb.	.59	.61¾
C.P.	lb.	.61	.63¾
Dicapryl Adipate	lb.	.40½	.43¼

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PLASTICIZERS & SOFTENERS (Cont'd)

Dicapryl Phthalate	lb.	.37	.39½
Dicapryl Sebacate	lb.	.61½	.64¾
Di-Carbitol Phthalate (dms.)	lb.	.42	.42½
Dicyclohexyl Phthalate	lb.	——	.42
Diethyl Phthalate (t.c.)	lb.	.29½	.32½
Di-2-ethlyhexyl Phthalate (t.c.)		——	.37
Dihexyl Adipate	lb.	.33	.35¼
Dihexyl Phthalate	lb.	.28½	.31¼
Dihexyl Sebacate	lb.	.50	.52¾
Di Isobutyl Azelate (dms.)	lb.	.54	.57
Di-iso-octyl Adipate (dms.)	lb.	.40½	.43¼
Di-iso-octyl Phthalate (t.c.)	lb.	.37	.39¾
Dimethyl Phthalate (t.c.)	lb.	.29¼	.30¼
Dimethyl Sebacate	lb.	.77	.79¾
Dinopol	lb.	.42¼	.43¼
Dioctyl Phthalate (dms.)	lb.	.41¾	.42¼
Dioctyl Sebacate (dms.)	lb.	.62½	.65¼
D.I.O.P. (dms.)	lb.	.41¾	.42¼
Dipolymer Oil	gal.	——	.55
Dispersing Oil No. 10	lb.	.05½	.05¾
Dutrex B	lb.	.02¾	.03¼
5 and 6	lb.	.020	.031
15E	gal.	.10	.20
20, 21, 22 and 25	lb.	——	.04
Elastex 10-P	lb.	.40	.42½
50-B	lb.	.34½	.37
DCHP	lb.	.42½	.43½
Estac	lb.	——	.16
Ethox (dms.)	lb.	.45¼	.45¾
Flexol B-400	lb.	.28	.30
DHP	lb.	.46	.48¼
DOP	lb.	.40	.42¼
TOF	lb.	.49	.51¼
3GH	lb.	.44	.46
4GO	lb.	.53	.55
4GO	lb.	.37	.39¼
8HP	lb.	.40	.42¼
Flexricin P-1 (and 4)	lb.	.40	.41¾
P-30		——	.37¼
P-8		——	.41¾
Pale 4	lb.	.35¼	.37¼
Galex W-100	lb.	.15½	.19½
G. B. Light Process Oil	lb.	.025	.032½
Medium Process Oil	lb.	.03½	.04½
G. B. Naphthenic Neutrals	gal.	.11	.18
Good-Rite GP233	gal.	.47	.49¾
GP261	gal.	.42	.44¾
Harflex 500 (dms.)	lb.	.36½	.39¼
Hercolyn (dfol.)	lb.	.20	.20½
Herron-H.T.	gal.	.16	.27
Herron-Plas	lb.	——	.03¾
Herron-Wax	lb.	.05¼	.06
No. 23	lb.	.08¼	.08¾
No. 24	lb.	.07¾	.07¾
HSC No. 13	lb.	.27	.30
Hylene B	lb.	.45	.50
C	lb.	.41	.46
D	lb.	.47½	.52½
Indonex 632½ (633½, 634½, 638½)	gal.	.1100	.1700
Kapsol	lb.	.34	.35
Kenflex	lb.	.19	.27
Kesscoflex 101 (dms.)	lb.	——	.39
102 (dms.)	lb.	——	.32½
103 (dms.)	lb.	——	.41½
104 (dms.)	lb.	——	.48
105 (dms.)	lb.	——	.33¼
106 (dms.)	lb.	——	.35½
KP 23 (dms.)	lb.	.31	.32
120 (dms.)	lb.	.31	.32
140 (dms.)	lb.	.47¼	.48¾
201	lb.	.53¼	.55¼
504	lb.	.35¼	.36½
555	lb.	.33	.33½
Kremol 40	gal.	.36	.46
Kremol 40	gal.	.39	.49
50	gal.	.39	.49
Kromisol (drums)	lb.	.38¼	.39¼
Kromitex (drums)	lb.	.37¼	.38¼
Lanolin, Tech. Anydrous	lb.	.21	.23
Lead Oleate		——	.30½
Lindol (dms.)	lb.	.34	.35
2-Mercaptoethanol (drums)	lb.	1.25	1.50
Methox (dms.)	lb.	.41¼	.41¾
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	——	.20
Methyl Stearate (dms.)	lb.	——	.30
Methol G		——	.25
R	lb.	——	.17
Montan Wax, Crude	lb.	.15	.18
Monten Wax	lb.	.12	.13
Monty Wax	lb.	——	.30½
Morflex No. 100	lb.	.37	.38¼
Natac	lb.	.10	.11
Nebony Resins (dms.)	lb.	.04	.04½
Neolene 210 (t.c.)	lb.	——	.16
212 (t.c.)	lb.	——	.14
220 (t.c.)	lb.	——	.15
Nerium	lb.	——	.09
Nevillac Resins (dms.)	lb.	.28	.55
Neville Resins (dms.)	lb.	.12	.18
Nevindene Resins (dms.)	lb.	.15	.18
Nevinol (dms.)			.20
Nevoil	lb.	.02½	.03½
Nevtex 10 (dms.)	lb.	.11	.12½
Nuba 1 (and 2) (dms.)	lb.	.05¼	.06¼
3X (dms.)	lb.	.07¾	.08¾
15 (and 30) Oil (dms.)	lb.	.36¼	.38
No. 480 Oil Proof Resin	lb.		.18
Olopex Q10 (dms.)	lb.	.40¾	.41¾
Opalwax	lb.	.37	.38
Ortho-Nitrobiphenyl	lb.	.06	.11
Ozokerite Wax No. 64			
White	lb.	.31	.32
Yellow	lb.	.25	.26

PLASTICIZERS & SOFTENERS (Cont'd)

Palm Oil	lb.	——	.11
Paradene Resins (dms.)	lb.	.06½	.07½
Para Flux (dms.)	gal.	.1925	.2025
2016 (dms.)	gal.	.22	.23
Para Lube (t.c.l.)	lb.	.046	.048
Parmo	lb.	.06	.13½
Pepton 22	lb.	.72	.75
PG-16 (drums)	lb.	——	.22¼
Picco 10 (and 25)	lb.	——	.13¼
75 (and 100)	lb.	——	.13
Rubber Resin 100	lb.	.1855	.1905
S.O.S.	gal.	——	.29
Piccocizer 30	lb.	——	.05½
Piccolastic A (and B, C, D, E)	lb.	.28½	.29
FT, FHF and FX	lb.	——	.1815
T-135	lb.	.22¾	.23¾
Piccolyte S Resins	lb.	.18½	.20
Piccolyte WW Resins	lb.	.45	.47
Piccoumaron Resins	lb.	.06¾	.17
Piccovar	lb.	.14½	.15
Piccovol	lb.	——	.02½
Pictar	gal.	——	.25
Pigmentar	lb.	.0410	.0655
Pigmentaroil	lb.	.0410	.0655
Plastac M	lb.	——	.09¼
Plasticizer 2286	lb.	——	.26¼
Plasticizer SC	lb.	.49	.52
Plasticizer W-13	lb.	.37	.38¾
Plasticizer XP-3	lb.	——	.50
Plastoflex 50	lb.	.34	.38
55	lb.	.34	.38
520	lb.	.37½	.38½
VS	lb.	.40	.43
Plastogen	lb.	.07¾	.08
Plastolein 9050 (c.l.)	lb.	——	.60¼
9055	lb.	——	.39
9058	lb.	——	.58½
9250	lb.	——	.37
9715	lb.	——	.39
Plastone	lb.	.27	.30
Polycin 781	lb.	.40	.41
Polyco 438	lb.	.34	.36
Polymel C-128	lb.	.19½	.20½
D	lb.	.22	.24
H-2	lb.	.22	.24
6	lb.	.06¾	.10
7	gal.	.23	.28
Process Oil C-255 (c.l.)	gal.	——	.22
Propylene Stearate (dms.)	lb.	——	.32
PT 400 Pine tar (600, 800) (t.c., dms.)	lb.	.0410	.0534
PX-104	lb.	.34	.42
PX-108	lb.	.38	.46
PX-208	lb.	.41½	.49
PX-404	lb.	.60	.68
Reogen	lb.	.13¼	.13½
465 Resin (dms.)	lb.	.07	.07½
Resin 731-C	cwt.	——	15.00
Resin C	lb.	.0200	.0285
Resinex	lb.	.03¼	.03¾
L-4	lb.	.02¼	.03
Rexflex	lb.	——	.15
Rosin Oil	gal.	.54	1.20
R.P.A. No. 2	lb.	——	.65
No. 3	lb.	——	.46
No. 5	lb.	——	.57
R.S.O. Softening Oil	lb.	.03	.08
Rubberol	lb.		.25¾
Rubtar	gal.	——	.40
Santicizer B-16	lb.	.50	.52
E-15	lb.	.47	.49
M-17	lb.	.44	.46
No. 107	lb.	.40	.42½
No. 140	lb.	.29	.31
No. 141	lb.	.40	.42½
No. 160	lb.	.34	.36
Sherolatum	lb.	.03½	.06
Softener No. 20	gal.	.09	.25
Staflex IXA	lb.	.34	.36
Stanolind Petrolatum	lb.	.048	.086
Wax	lb.	.31	.32¾
Staybelite Resin (dms.)	cwt.	——	12.00
Sunny South Burgundy Pitch	lb.	.1009	.1054
Sunny South Pine Tar	lb.	.0410	.0655
Sunny South Rosin Oil	gal.	.58	.86½
Superla Wax	lb.	.27¼	.32
Syncera Wax	lb.	.19	.24
Syn Tac (c.l.)	gal.	——	.33
Synthetic Revertant Oil	lb.	——	.16
Tar, Refined	gal.	.12	.17
K-Tarnel NR (t.c.)	gal.	——	.0851
Terpene A	gal.	——	.65
TP-90B	lb.	——	.67
TP-95	lb.	——	.65
TP-98	lb.	——	.65
Triacetin	lb.	.34	.45
Triceresyl Phosphate (t.c.)	lb.	——	.55
Turgum S	lb.	.08¾	.09¾
Vanadiset A	gal.	.13	.20
Vistac No. 1	gal.	1.00	1.16
P	lb.	.18	.18½
Vopcolene 50	lb.	——	.37
Witresin—Granular	ton	41.00	43.00
Solid	ton	36.00	38.00

PROCESSING AIDS

Castor Oil, Processed (dms.)	lb.	——	.35½
Refined (drums)	lb.	——	.19¼
Castorwax (min. 250 lbs.)	lb.	——	.27¼
Dutrex 7	lb.	.12	.20
ELA	lb.	——	.80
Millrex	lb.	——	.15

PROCESSING AIDS (Cont'd)

Resin No. 510	lb.	.13¼	.16½
Zyrox	lb.	.50	.79

PROTECTIVE & STABILIZING AGENTS

Acacia	lb.	.12¾	.21
Alpha Protein	lb.	.24	.28
Ammonium Alginate	lb.	——	.95
Aroostoocrat	lb.	——	.07½
Carob Bean Flour	lb.	——	.46
Casein	lb.	.28	.38
Ethylene Diamine 68%	lb.	.47	.50
Karaya Gum	lb.	.20	.50
Prosein	lb.	.0600	.0630
Rex Compound No. 2801	lb.	——	.15
Stablex B	lb.	.50	.95
K	lb.	.27	.35

RECLAIMING AGENTS

Armeen C	lb.	.50	.58
T	lb.	.42	.50
No. 517 H.B. Oil	gal.	.11½	.16½
535	gal.	.22	.27
C-6 Oil (and 28, 32)	gal.	.33	.38
C-10 Oil	gal.	.25	.30
C-33 Oil	gal.	——	.21½
Caustic Soda—Flake 76% (c.l., drums)	cwt.	——	3.75
Liquid 50% (t.c.)	cwt.	——	2.55
Solid 76% (c.l., dms.)	cwt.	——	3.35
Cresylic Acid (99-100%)	gal.	1.20	1.39
D-4	gal.	——	.27
E-5	gal.	——	.25
G. B. Reclaiming Oil	gal.	.12	.18
CD-10	gal.	.10	.16
CD-50-U	gal.	.18	.24
Gensol No. 6 (t.c.)	gal.	——	.45
Heavy Aromatic Naphtha	gal.	——	.12¼
LX-77 Reclaiming Solvent	gal.	.21	.33
LX-572 Reclaiming Oil	gal.	.27	.33
LX-777 Reclaiming Oil	gal.	.23	.33
Neo-Fat D-242	lb.	.05½	.07¾
PRR 1	gal.	.15	.35
PT 67 Light pine oil	gal.	.50	.60
PT 101 Pine tar oil	lb.	.0410	.0534
Q Oil	gal.	——	.286
Reclaiming Oil 1621	lb.	.03	.04
Reclaiming Oil 3186 (t.c.)	gal.	.28	.38½
Reclaiming Oil 3186-G	gal.	.25	.36½
Reclaiming Reagent No. 4	lb.	.12	.15
R.P.A. No. 3	lb	——	.46
RR-10		——	.35
Soda Ash (c.l., bags)	cwt.	——	1.50
Solvenol 1 (dms.)		——	.60
Solvent 534	gal.	.20½	.26½
Solvent Oil 21	gal.	.24	.29
C-42	gal.	.23	.28
Union Solvent 4060-O	gal.	——	.149
X-1 Resinous Oil	lb.	.0210	.0275

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98	lb.	.0740	.1225
Continental F	lb.	.0740	.1225
Croflex	lb.	.0740	.1225
Dixiedensed (and S)	lb.	.0740	.1225
Kosmobile (and S)	lb.	.0740	.1225
Micronex HPC	lb.	.0740	.1225
Spheron 4	lb.	.0740	.1225
Witco Disperso No. 6	lb.	.0740	.1225

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95	lb.	.0740	.1225
Continental A	lb.	.0740	.1225
Croflex TH	lb.	.0740	.1225
Dixiedensed HM (and S-66)	lb.	.0740	.1225
Huber Arrow TX	lb.	.0740	.1225
Kosmobile HM (and S-66)	lb.	.0740	.1225
Micronex Standard	lb.	.0740	.1225
Spheron 6	lb.	.0740	.1225
Texas M	lb.	.0740	.1225
Witco Disperso No. 1	lb.	.0740	.1225

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42	lb.	.0740	.1225
Continental AA	lb.	.0740	.1225
Croflex 77	lb.	.0740	.1225
Dixiedensed 77	lb.	.0740	.1225
Kosmobile 77	lb.	.0740	.1225
Micronex W-6	lb.	.0740	.1225
Spheron 9	lb.	.0740	.1225
Texas E	lb.	.0740	.1225
Witco Disperso No. 12	lb.	.0740	.1225
Wsex	lb.	.0740	.1225

Channel, Conductive (CC) (bags)

Continental R-40	lb.	.1800	.2400
Dixie 5 Dustless	lb.	.0950	.1550
Dixie Voltex	lb.	.1950	.2500
Kosmik Dustless	lb.	.0950	.1550
Kosmik Voltex	lb.	.1950	.2500
Spheron C	lb.	.1400	.1850
Spheron N	lb.	.2500	.3000
Voltex	lb.	.1950	.2500

Conductive Furnace Black (CFB) (bags)

Shawinigan Acetylene Black	lb.	.1600	.2200

Furnace, Fast Extruding (FEF) (bags)

Arovel	lb.	.0600	.1000
Croflex 50	lb.	.0600	.1000
Dixie 50	lb.	.0600	.1000
Kosmos 50	lb.	.0600	.1000
Statex M	lb.	.0600	.1000
Sterling SO	lb.	.0600	.1000

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REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, General Purpose (GPF) (bags)

Sterling V	lb.	.0500 -	.0900

Furnace, High Modulus (HMF) (bags)

Collocarb	lb.	.0550 -	.0950
Continex HMF	lb.	.0550 -	.0950
Croflex 40	lb.	.0550 -	.0950
Dixie 40	lb.	.0550 -	.0950
Kosmos 40	lb.	.0550 -	.0950
Modulex	lb.	.0550 -	.0950
Statex 93	lb.	.0550 -	.0950
Sterling L	lb.	.0550 -	.0950

Furnace, Medium Abrasion (MAF) (bags)

Philblack A	lb.	.0600 -	.1000

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF	lb.	.0400 -	.0800
Croflex 20	lb.	.0400 -	.0800
Dixie 20	lb.	.0400 -	.0800
Essex	lb.	.0400 -	.0800
Furnex	lb.	.0400 -	.0800
Gastex	lb.	.0450 -	.0850
Kosmos 20	lb.	.0400 -	.0800
Pelletex	lb.	.0400 -	.0800
Sterling NS	lb.	.0400 -	.0800
Sterling R	lb.	.0450 -	.0850
Sterling S	lb.	.0400 -	.0800

Furnace, Fine (FF) (bags)

Statex B	lb.	.0650 -	.1050
Sterling 99	lb.	.0650 -	.1050

Furnace, High Abrasion (HAF) (bags)

Aromex	lb.	.0790 -	.1250
115	lb.	.0890 -	.1290
Continex HAF	lb.	.0790 -	.1250
Croflex 60	lb.	.0790 -	.1175
Dixie 60	lb.	.0790 -	.1175
Kosmos 60	lb.	.0790 -	.1175
Philblack O	lb.	.0790 -	.1190
Statex R	lb.	.0790 -	.1250
Vulcan 3	lb.	.0790 -	.1220

Thermal, Fine (FT) bags)

P-33 (c.l.)	lb.	— -	.0550

Thermal, Medium (MT) (bags)

Thermax (c.l.)	lb.	— -	.0350
Thermax, Stainless (c.l.)	lb.	— -	.0450

REINFORCING AGENTS—SILICA

Hi-Sil	lb.	.11 -	.12½

REINFORCING AGENTS—MISCELLANEOUS

Darex Copolymer No. 3	lb.	.42 -	.44
X34	lb.	.37 -	.39
X43 (and 43E)	lb.	.38 -	.40
Darex Copolymer Latex No. 3 (and X34)	lb.	.36½ -	.50
Durez 12687 (and 12707)	lb.	— -	.37
Durez 13355	lb.	— -	.29½
Good-Rite Resin 50	lb.	.42 -	.44
Kralac A	lb.	.39 -	.40
Marbon S and S1	lb.	.42 -	.49
8000	lb.	.42 -	.49
Marmix	lb.	.42 -	.49
Pliolite Latex 190	lb.	.30 -	.34
Pliolite NR	lb.	.74 -	.76
Pliolite S3, S6, and S6B	lb.	.42 -	.44
C3 Masterbatch	lb.	.52 -	.64
C4 Masterbatch	lb.	.55 -	.62
G Masterbatch	lb.	.44 -	.51
G50 Masterbatch	lb.	.44 -	.51
N Masterbatch	lb.	.48 -	.55
R Masterbatch	lb.	.62 -	.69
WA	lb.	.68 -	.75
S113V76	lb.	.48 -	.55
Polyco 220	lb.	.22 -	.23

RETARDERS

Dutch Boy Normasal	lb.	— -	.46
ESEN	lb.	— -	.36
Retarder ASA	lb.	— -	.55
Retarder PD	lb.	.34 -	.36
Retarder T.C.M.	lb.	— -	.65
Retarder W	lb.	— -	.43
Retardex	lb.	.47 -	.50

RUBBER SUBSTITUTES

Mineral Rubber

38	ton	38.00 -	40.00
Black Diamond	ton	38.00 -	40.00
Byerlyte	ton	47.00 -	54.00
Gilsonite, Selects (c.l.)	ton	37.00 -	38.00
Hard Hydrocarbon (dms.)	ton	46.50 -	48.50
Herron Flake	ton	— -	45.00
Mineral Rubber, solid	ton	42.50 -	44.50
Pioneer	ton	35.00 -	46.00

Vulcanized Vegetable Oils (Factice)

Amberex	lb.	.29 -	.36
Brown	lb.	.1425 -	.2680
Dispersed	lb.	.26 -	.42
Neophax	lb.	.1570 -	.2680
White	lb.	.1440 -	.2850

Miscellaneous Rubber Substitutes

G.B. Asphaltenes	lb.	.06 -	.06½
Gilsowax B	lb.	.09 -	.11
Resin No. 1098 (drums)	lb.	— -	.62
No. 1198	lb.	.46¾ -	.49¾

SOLVENTS

Acetone (dlvd.)	lb.	.08½ -	.11
American Dipentine	gal.	.47 -	.68
American Pine Oil	gal.	.75½ -	.95¾
Amsco Lactol Spirits (t.c.)	gal.	— -	.15
Rubber Solvent (t.c.)	gal.	— -	.17
Solv A (t.c.)	gal.	— -	.25½
Solv A-80 (t.c.)	gal.	— -	.30½
Solv B (t.c.)	gal.	— -	.29
Solv B-90 (t.c.)	gal.	— -	.32
Solv D (t.c.)	gal.	— -	.30½
Special Naphthalite (t.c.)	gal.	— -	.17
Textile Spirits (t.c.)	gal.	— -	.18
Amyl Chlorides, Mixed (t.c.l.) (drums)	lb.	.10 -	.11
Benzol 90%	gal.	— -	.48
Butyl Acetate (t.c.)	lb.	.15¼ -	.17¼
Butyl Alcohol (t.c.)	lb.	.13 -	.175
Secondary (dlvd.)	lb.	.11 -	.13½
Tertiary (dlvd.)	lb.	.12 -	.14½
Carbon Bisulfide, Tech	lb.	.0440 -	.0800
Carbon Tetrachloride	lb.	.08 -	.08½
Cosol	gal.	.37 -	.43
Cosol 2	gal.	.42 -	.48
Cyclohexane	lb.	.09¼ -	.11¾
Cyclohexanone	lb.	.25 -	.27 a
Diacetone, Pure (dlvd.)	lb.	.12 -	.14½
Dichlorethyl Ether (dms.)	lb.	.15 -	.17
Formal (dms.)	lb.	.29¼ -	.31¼
Dichloropentane (t.c.l.)	gal.	.04 -	.07
Dicom	gal.	.30 -	.42
Dipentene (dms.)	gal.	— -	.60
Halowax Oil	lb.	.28 -	.41
Heptanes (t.c.)	gal.	.17 -	.22
Hexalin Cyclohexanol	lb.	.20 -	.22 a
Hexanes (t.c.)	gal.	.17 -	.22
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.43 -	.60
Ether, Ref. (dlvd.)	gal.	.05 -	.07½
Mesityl Oxide (dlvd.)	lb.	.11½ -	.14
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.54½ -	.72¼
Methyl Ethyl Ketone	lb.	.11 -	.13½
Methyl Isobutyl Ketone (dlvd.)	lb.	.13 -	.15½
N-5 Pentane Mix. (t.c.)	gal.	— -	.13½
N-6 Hexanes (t.c.)	gal.	— -	.14½
N-7 Hexanes (t.c.)	gal.	— -	.13½
Penetrell	gal.	.47 -	.68
Petrolene (t.c.)	gal.	— -	.13125
Picolines, Alpha, Refined	lb.	— -	.40
Mixed	lb.	— -	.30
Proprietary Alcohol (t.c.)	gal.	— -	.43½
Pyridine, Refined	lb.	— -	1.05
Quinoline	lb.	— -	.61¾
Rubber Solvent (t.c.)	gal.	— -	.16
Rubsol (t.c.)	gal.	— -	.11875
Skellysolve B (Hexanes) (t.c.)	gal.	— -	.148
C (Heptanes) (t.c.)	gal.	— -	.141
E (Octanes) (t.c.)	gal.	— -	.155
R (Solvent Naphtha)	gal.	— -	.114
Solvenol (dms.)	gal.	— -	.36
Solvent, Crude, Light	gal.	.19 -	.28
Solvesso 100 (t.c.)	gal.	— -	.28
150 (t.c.)	gal.	— -	.28
Sunny South Dipentine	gal.	.47 -	.68
Sunny South Pine Oil	gal.	.75½ -	.95¾
Suprex	gal.	.1140 -	.1600
Toluene (drums)	gal.	— -	.28
Toluol (t.c.)	gal.	— -	.45
Trichlorethane	lb.	.11½ -	.13½
Triglycol Dichloride (dms.)	lb.	.59½ -	.60½
Union Thinner 1	gal.	— -	.163
3	gal.	— -	.165
5	gal.	— -	.45
7	gal.	— -	.153
2-50-W Hi-Flash	gal.	— -	.41
X-7 Sp. Heptanes (t.c.)	gal.	— -	.11
Xylol	gal.	— -	.45

STABILIZING AGENTS (for Vinyl Resins)

Basic Silicate White Lead	lb.	.1715 -	.1815
No. 201	lb.	.2271 -	.2371
Bunatak Polymer No. 780	lb.	— -	.04
No. 5514	lb.	— -	.35
BVS	lb.	— -	.583¼
Cadmium Stearate	lb.	— -	1.25
Dutch Boy DS-207	lb.	— -	.56
Plumb-O-Sil A	lb.	— -	.311¼
B	lb.	— -	.323¼
Trihase	lb.	— -	.293¼
Dythal	lb.	— -	.423½
Lead Stearate, Precip.	lb.	.36 -	.38
Fused	lb.	— -	.355½
Lithium Stearate	lb.	.63 -	.65
Stabelan E	lb.	1.25 -	1.40
XL	lb.	.55 -	.65
Stabilizer No. 3	lb.	— -	2.15
Stabilizer No. 21	lb.	— -	1.08
Stabilizer No. 52	lb.	— -	2.15
Stabilizer No. 89	lb.	— -	.75
Stabilizer No. 143	lb.	— -	.86
Stabilizer BC-12	lb.	— -	.90
Stabilizer B-5	lb.	— -	.70
Stabilizer CH-M	lb.	— -	.65
Stabilizer E6B	lb.	— -	.95
Stabilizer JCX	lb.	— -	.68
Stabilizer L	lb.	— -	.60
Stabilizer OM-10	lb.	— -	2.15
Stabilizer OM-18	lb.	— -	3.65
Stabilizer SN	lb.	— -	.48
Stabilizer V-1-M	lb.	— -	.45
Stabilizer V-9	lb.	— -	.85
Stabilizer VL-2	lb.	— -	1.27
Stabilizer VL-3	lb.	— -	1.18

STABILIZING AGENTS (Cont'd)

Stabilizer V-7939	lb.	— -	.60
Vanstay L	lb.	.33 -	.35
H	lb.	.75 -	.77
HH	lb.	.98 -	1.00

SUN CHECKING AGENTS

Antisol	lb.	— -	.23
Antisun	lb.	— -	.21
Heliozone	lb.	.25 -	.26
NR	lb.	— -	1.50
Sharples Wax	lb.	.23 -	.28
Sunolite	lb.	.20 -	.23
Sunproof	lb.	.25 -	.26
Imp.	lb.	.23 -	.24
Jr.	lb.	.18 -	.19
Tonox	lb.	.50 -	.52

TACKIFIERS

Arceo 620-32B	lb.	.20 -	.21
716-30	lb.	.19½ -	.20½
1041-21	lb.	.17½ -	.18½
Galex (drums)	lb.	.15½ -	.19¼
Indopol H-300	gal.	1.00 -	1.16
Koresin	lb.	.73 -	.75
Liquid Rubber Flux	lb.	— -	.14
Nitox (c.l.)	cwt.	— -	15.00
Pentalyn A (dlvd.)	lb.	.16 -	.16½
Resin V	lb.	— -	.23¾
Rubtack	lb.	— -	.12
Staybelite Ester No. 10 (dlvd.)	lb.	.24 -	.24½
Synthol	lb.	— -	.24¾
Vistac No. 1	gal.	1.00 -	1.16
A	lb.	.21½ -	.22¾
Zirex (c.l.)	cwt.	— -	15.00

THICKENERS (FOR LATEX)

Alcogum AN-6	lb.	— -	.93
AN-10	lb.	— -	.98¾
Betanol (drums)	lb.	— -	.70
Emulsorex No. 5	lb.	— -	.35
Lecithin	lb.	.12 -	.17
Modicol VD	lb.	— -	.12½
VE	lb.	— -	.10½
VF	lb.	— -	.10½
VK	lb.	— -	.07
Polyco 296	lb.	.15 -	.16
296-N	lb.	.15 -	.16
Propylene Laurate (dms.)	lb.	.57 -	.67
Sodium Silicate	cwt.	1.50 -	2.65

VULCANIZING AGENTS

Selenium

Ancasal*	lb.	— -	2.00
Vandex	lb.	— -	3.50

Sulfur

Blackbird	cwt.	— -	2.30
Crystex	lb.	.19½ -	.23
Darex Dispersed Sulphur	lb.	.12 -	.17
Devil (c.l.)	cwt.	— -	1.75
Dispersed Sulfur	lb.	.12½ -	.14½
Insoluble Sulfur 60	lb.	.12½ -	.13
Spider	cwt.	— -	2.30
Star (c.l.)	cwt.	— -	2.25
Tire (c.l.)	cwt.	— -	1.75
Tube	cwt.	— -	2.25

Tellurium

Ancatel*	lb.	— -	2.00
Telloy	lb.	— -	2.50

WETTING AGENTS

Advawet No. 10	lb.	— -	.20
No. 15	lb.	— -	.21½
No. 33	lb.	— -	.48
Aerosol OT 70% Clear	lb.	.80 -	1.00
Alrosol (dms.)	lb.	— -	.40
Alrosperse	lb.	— -	.18
Aquarex D	lb.	— -	.80
MDL Paste	lb.	— -	.33
ME	lb.	— -	.97
NS	lb.	— -	.60
WA Paste	lb.	— -	.28
Areskap 50	lb.	.30 -	.38
Dry 100	lb.	.60 -	.72
Aresket 240	lb.	.30 -	.38
Dry 300	lb.	.60 -	.72
Aresklene 375	lb.	.42 -	.57
Dry 400	lb.	.70 -	.84
Armacs	lb.	.29 -	.76
Arquads	lb.	.21 -	.61
Ethe-chemicals	lb.	.34 -	.80
Kesco E-122 (dms.)	lb.	— -	.49
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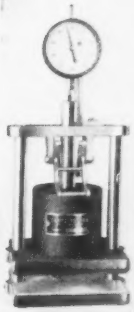

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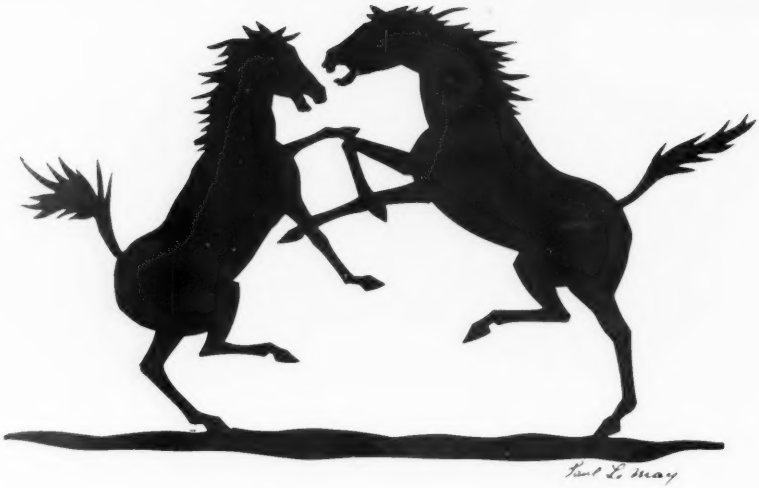

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